JAN 6 - 193

After January 1, 1934, the American Pharmaceutical Association Will Occupy the Headquarters Building, Constitution Ave. and 22nd Street, N. W., Washington, D. C. This Step Marks the Beginning of a New Era in the History of the Organization.

Vol. XXII, No. 12 DECEMBER, 1933

JOURNAL
OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

CONTENTS

Frontispiece and Sketch—J. Lester Hayman 1209
Editorial:
- The Season's Greetings 1210
- Food, Drug and Cosmetic Legislation 1210
- Studies in Professional Accuracy 1213
- Looking Backward and Thinking Forward 1213

Scientific Section:
- A New Field of Investigation in Pharmacognosy: The Microscopy of Glandular Products—Youngken and Reed 1215
- Notes on the Water of Crystallization of Quinine Sulphate—Beal and Szalkowski 1219
- The Detection of Small Quantities of Carbon Monoxide in Medicinal Oxygen—Schmidt and Krantz, Jr. 1222
- Licorice Fern and Wild Licorice as Substitutes for Licorice—Fischer and Lynn 1225
- The Pigeon as a Hematopoietic Test Animal—Peabody and Neale 1231
- A Method for the Determination of Minute Amounts of Aldehydes in Ether—Carey, Green and Schoetzow 1237
- Qualitative Tests for Ephedrine and Its Derivatives—Feng and Read 1241
- A Note on the Water Content of Magnesium Oxide—Schmidt and Krantz, Jr. 1245
- Coöperation between Physicians and Pharmacists of the Northwest—Bender 1246

Bibliography of Pharmaceutical Research—DuMez 1247
The Identification of Some Hypnotics of the Barbituric Acid Series—Hargreaves and Nixon 1250
A Practical Enteric Coating for the Retail Pharmacist—Bukey and Rhodes 1253
A Proposed Formula for Belladonna Ointment—Lee and Hoch 1255
Prescription Accuracy as Shown by State Board of Pharmacy Examinations—A Preliminary Study—Swain 1259
Binding Up a Wound—Kilmer (*Concluded*) 1262
Publicity and the Pharmacist—Garvin 1265
The Department of the American Association of Colleges of Pharmacy:
- Introductory Lecture to a Course in History of Pharmacy—Kremers 1270

Symposium on Practicing Professional Pharmacy:
- The Foundations of Success for Professional Pharmacy—Cook 1279
- The Hospital Formulary—Hatcher and Stainsby 1281
- Pharmacology in the Medical Curriculum and the United States Pharmacopœia—Krantz, Jr. 1282

The Sections of the American Pharmaceutical Association 1284
The Growth of Professional Pharmacy—Jordan 1295
Proceedings of the Local Branches 1296
Association Business 1302
Marketing Prescription Department Items—Delgado 1304
Editorial Notes 1306
Obituary 1308
Book Notices and Reviews 1310
Index III
Advertising—Cover Pages 2, 3 and 4 and pp. I–XXII.

Published Monthly by the American Pharmaceutical Association: Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md. Annual Subscription, $4.00; Canada, $4.35; Other Foreign, $4.50; Single Numbers, 35 cents; Canada, 40 cents; Other Foreign, 50 cents.

THE 82nd ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN WASHINGTON, D. C.

The 1934 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Washington.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

GASTRON

A complete gastric gland extract, in a potent agreeable solution.

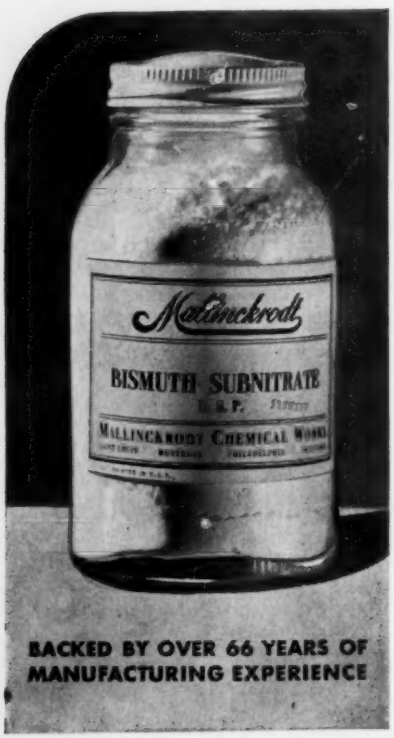
Supplied in 6 oz. and 32 oz. Bottles

GASTRON *with* IRON

Supplied in 6 oz. Bottles Only

FAIRCHILD BROS. & FOSTER

New York



BACKED BY OVER 66 YEARS OF MANUFACTURING EXPERIENCE

THE LABEL PROTECTS
the Quality of your Prescriptions

Every item manufactured under the Mallinckrodt Label is checked and rechecked.

They must meet all official requirements or better, Mallinckrodt quality established by over 66 years of manufacturing experience.

Insist on the Mallinckrodt signature on your fine prescription chemicals. Order them in the original Mallinckrodt shelf bottles. The first of their kind—the most convenient and economical in use.

Send for latest price list of the "Famous 84" most largely used prescription items and full description of the new uniform-sized shelf bottle in which they are packed.

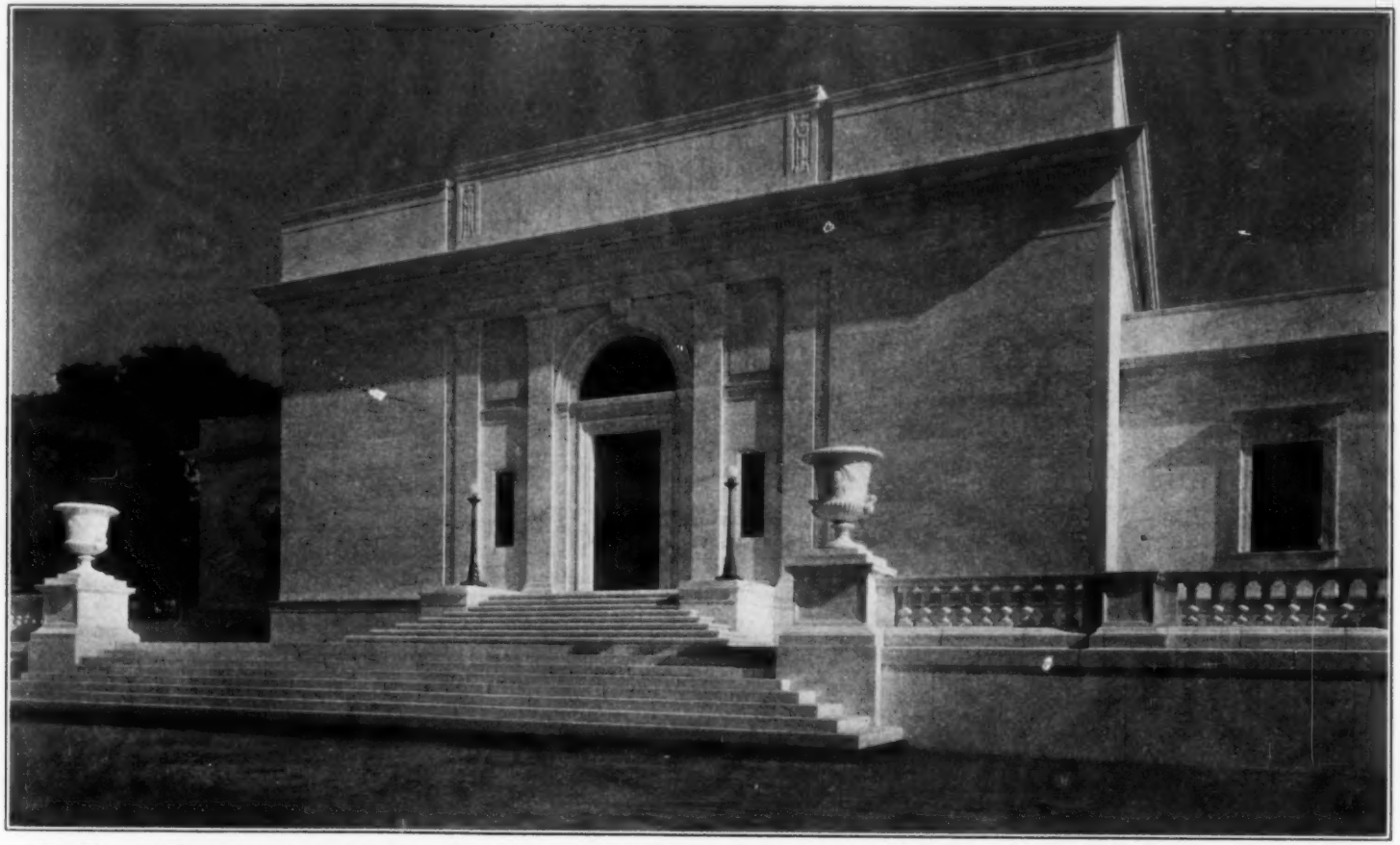
Mallinckrodt

CHEMICAL WORKS

2nd & Mallinckrodt Sts., St. Louis, Mo.

Over 1500 Fine Chemicals for the Prescription Druggist

ST. LOUIS • MONTREAL • NEW YORK



The Home of the AMERICAN PHARMACEUTICAL ASSOCIATION, after January 1, 1934, Constitution Ave. and 22nd St., N. W.—The American Institute of Pharmacy.

J. LESTER HAYMAN.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XXII DECEMBER, 1933 No. 12

J. LESTER HAYMAN.

Joseph Lester Hayman, president of the Conference of Pharmaceutical Association Secretaries, 1932–1933, was born June 3, 1896, at Whitesville, Sussex County, Delaware—the son of Dr. E. H. and Rosa M. Hayman. The family moved to Murray City, Ohio, in 1902, and here the youth received his early education; much of the time, after school hours, was spent in his father's pharmacy. After graduating from the Murray City, Ohio, and the Ann Arbor, Michigan, high schools, the young man entered the College of Pharmacy of the University of Michigan, where he earned the Ph.G. and B.S. degrees. Soon after graduation, he accepted an instructorship in the Department of Pharmacy at the University of West Virginia. He was rapidly promoted on the faculty to Associate Professor of Pharmacognosy, which position he now holds. In 1924, he returned to the University of Michigan to receive the Master of Science in Pharmacy.

The subject of this brief sketch became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1924. In 1926, he was elected secretary-treasurer of the West Virginia Pharmaceutical Association and has been reëlected since then; his monthly letters to the members are distinctive. He is member of the House of Delegates and chairman of the Membership Committee for West Virginia of the AMERICAN PHARMACEUTICAL ASSOCIATION. He was elected to serve as secretary of the Conference of Pharmaceutical Associations, which was formed in St. Louis to discuss and prepare a retail druggists' NRA Code.

J. Lester Hayman and Alice Lucille Bennett were married September 18, 1920, in Athens, Ohio. They have one daughter, Alice Margaret, aged twelve, and recently lost their only son, aged three years.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase Street, BALTIMORE, MD.

THE SEASON'S GREETINGS.

PARTS of an editorial of a previous year are repeated in the following: "We are prone to view the opportunities of other activities as more promising, but proper search and endeavor reveal that the 'acres of diamonds' are where we concentrate our well-directed efforts. Whatever the passing year may have been, a new year is expressive of hope, which, according to Jeremy Collier, 'is a vigorous principle; it is furnished with light and heat to advise and execute; it sets the head and heart to work, and animates a man to do his utmost. And thus, by perpetually pushing and assurance, it puts a difficulty out of countenance, and makes a seeming impossibility give way.'"

Ten years ago the A. PH. A. Headquarters was little more than a dream; now it has become a realization, for on January 1st the officers of the ASSOCIATION will be located in its beautiful home at Constitution Ave. and 22nd Street, N. W., Washington, D. C.[1]

We express to all members our *Christmas Wish* for a joyful season of gladness, health and happiness. The *New Year Message* is one of hope—that the financial and industrial activities may improve, and confidence and courage be strengthened with return of greater prosperity.

FOOD, DRUG AND COSMETIC LEGISLATION.

AT ITS first meeting, in 1852, the AMERICAN PHARMACEUTICAL ASSOCIATION adopted seven objects, the first being "To improve and regulate the drug market by preventing the importation of inferior, adulterated or deteriorated drugs and by detecting and exposing home adulterations." The third object included "encouraging home production and manufacture in the several departments of the drug business." The ASSOCIATION has a commendable and consistent record in supporting every effort to enact and strengthen national and state legislation regulating the strength, quality and purity of drugs, medicines and medical supplies. Its proceedings show that this subject has been considered, in some form, at every annual meeting. Its officers and members have had an important part in drafting and securing the enactment of every state and national law relating to pure drugs.

They took a prominent place, so far as drugs were concerned, in the Pure Food and Drug Congress, the body that brought about the adoption of the Pure Food and Drugs Act of June 30, 1906, which has since been the basis of similar legislation by every state of the Union and which was pronounced by a select committee of the British Parliament as the most effective legislation on the subject by any of the civilized nations. To their credit, medicine and pharmacy had developed satisfactory standards for drugs and preparations, in the U. S. P. and N. F., which were adopted in the Act.

Twenty-seven years of enforcement have very naturally brought to light a number of omissions and defects in the law. Developments in this field have

[1] Post office address, 2215 Constitution Ave., Washington, D. C.

brought about other deficiencies, especially with respect to the control of advertising. Cosmetics which were not included have increased tremendously in popularity and use.

The few amendments to the Act adopted by Congress, while improving, have not remedied the situation. Collateral legislation, such as that with respect to use of the mails and to the regulation of interstate commerce, has aided materially in the correction of abuses but has not checked them satisfactorily. Various officials of the governments and others have suggested amendments from time to time without much success other than to draw attention to the need for them. The belief has grown in recent years that the Act should be amended or completely rewritten to afford the protection that the public requires in the selection and use of these products which so materially affect public health and the welfare of the people. With the advent of the present administration, this proposal was given active support by the officials of the Department of Agriculture, leading to the drafting of a complete revision which was introduced by Senator Copeland, S. 1944, and by Representative Sirovich, H. R. 6110.

In 1914, the AMERICAN PHARMACEUTICAL ASSOCIATION suggested the organization of the National Drug Trade Conference made up of delegates from the national pharmaceutical associations, to bring about concerted action of the profession and industry on matters of general interest to all branches and has consistently supported it. The Conference has functioned successfully and now embraces nine national associations. Its first effort was to represent pharmacy in securing the Harrison Act regulating narcotics. It has had a part since that time in the consideration of all national legislation affecting pharmacy and the drug industry. Through the Conference, the profession and industry can present a united front in support of or in opposition to any matter not controversial among its member associations and without restricting the freedom of any association to take care of questions of particular interest to them. The Conference meets annually and functions, in the interim, through an Executive Committee representing each member association.

The movement to amend or rewrite the Food and Drugs Act naturally had the immediate attention of the Conference. The officials were requested to grant a meeting which was arranged for April 27th, last. The representatives of the Conference expected to see and discuss the draft of the proposed legislation. Instead, they were requested to submit suggestions which they were not prepared to do. The result was a general discussion, after which the offer of later coöperation in drafting the legislation was made. The next development was the introduction of the Copeland and Sirovich bills as drafted by officials and representatives of the Department of Agriculture and which have had wide publicity and discussion in the pharmaceutical press and at many meetings. It will be recalled that Mr. W. G. Campbell, Chief of the Food and Drug Administration, addressed the Madison meeting and that after full consideration of the bill, the following resolution was adopted:

"*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION record its approval of the proposed changes in the Federal Food and Drug Law in so far as they provide for more effective protection of the public health, and be it further

"*Resolved*, that in the interest of a sound public policy the delegation of arbitrary discretionary powers in connection with the enforcement of Food and Drug legislation be disapproved."

At the annual meeting of the Executive Committee, on November 1st, this legislation was made an important topic for consideration at the annual meeting of the National Drug Trade Conference on December 5th. Dr. James H. Beal was requested, because of his long experience with and through knowledge of the subject, to prepare a complete report on the Copeland Bill and its probable effects on pharmacy and the drug industry. This report was a masterly discussion of the bill and of its defects and dangers so far as pharmacy is concerned. It conceded that certain conditions should be controlled but showed that this could be done most effectively by amendments to the present Act, thus preserving the mass of judicial decisions under it and the state acts and making simpler the necessary amendments of the latter by the several states. After full consideration, the Conference authorized a special committee representing each member association and with Dr. Beal as chairman, to prepare the report for submission to the Senate Committee having the bill in charge, to draft such amendments to the present Act as are necessary to control advertising, etc., and to represent the Conference at the hearing on the bill on October 7th.

The committee sat in Washington on December 6th, and prepared an amended copy of the Act embodying the various suggestions for its improvement. Chairman Beal was selected to represent the Conference and as the first speaker for pharmacy at the hearing, at which time his report and the amended act were to be submitted.

Secretary of Agriculture Wallace opened the hearing on December 7th, which was before a sub-committee consisting of Senators Copeland, McNary and Caraway and of the Senate Committee on Commerce, in support of the bill and was followed by Mr. Campbell who explained each section, covering several hours, submitting information and examples in support of them.

Dr. Beal was called, following Mr. Campbell as the first speaker in opposition and was introduced by President Carson P. Frailey of the Conference. He spoke for almost two hours, during which he had splendid attention and gave the objections of the Conference to the bill and its suggestion for the amendment of the present Act to correct the deficiencies which the Conference not only "admitted" but "asserted," should be corrected in the public interest. The hearing adjourned at about 7:00 P.M.

On December 8th a number of speakers were heard in favor of and against the bill, which completed the hearing. It is expected that the Copeland Bill will be completely amended or discarded in favor of amendments to the present Act—Dr. Beal, S. L. Hilton and E. F. Kelly were the A. PH. A. delegates to the Conference. Many other members of the ASSOCIATION were present as delegates from the other associations. The AMERICAN PHARMACEUTICAL ASSOCIATION has strongly supported the Conference and has worked closely with it under the conviction that such a representative body is required to deal with matters of general interest.

The Conference did a splendid work for pharmacy in supporting the purposes of the Copeland Bill, in opposing the provisions it considered as unsound and dangerous and in submitting, in correct form, the amendments to the present Food

and Drugs Act which will effectively protect the public health and welfare. Every pharmaceutical interest should support the Conference.—E. F. Kelly.

STUDIES IN PROFESSIONAL ACCURACY.

RECOGNIZING the need for accuracy in professional pharmaceutical work, the AMERICAN PHARMACEUTICAL ASSOCIATION has appointed a committee to study the whole field of prescription compounding with the object of establishing acceptable tolerances in this exacting branch of pharmacy. Important data have already been collected regarding prescriptions for capsules, powders, pills, and other types and classifications. The work has received the coöperation of boards of pharmacy, and several colleges of pharmacy have participated in the studies which have been made.

No doubt some few years may be required to complete the task. However, once the field has been covered adequately, information will be available upon which to base authoritative conclusions regarding the degree of accuracy which should be met with in prescription practice. At the present time, no one is in position to state what tolerances or deviations should be permitted, or what accuracy should be required. Law enforcement officials, when dealing with prescription compounding, must rely on their unsupported and purely arbitrary judgment. It is the purpose of the ASSOCIATION to supply the facts which will enable enforcement officers to act wisely and with due consideration to the many variables which must be taken into account.

A closely related study has been assigned to the Committee on Weights and Measures. This committee will undertake the collection of factual information dealing with the weighing and measuring apparatus now found in drug stores. It is recognized that professional accuracy is largely dependent upon accurate apparatus. It is, therefore, important that a study be made of the professional and technical equipment available in the drug store for professional work. In fact, in some states, legislation is being proposed to enable the board of pharmacy, or some other state agency, to determine what scientific and professional equipment a drug store must possess. The AMERICAN PHARMACEUTICAL ASSOCIATION has undertaken the job of ascertaining the actual facts so that legislation, if any is needed, may be in accordance with known conditions.

It is felt that the Committees on Prescription Tolerances and on Weights and Measures have an unusual opportunity for constructive work, a work which will greatly aid in the development of professional pharmacy and be of real value to the practicing pharmacist.—R. L. SWAIN, *President.*

LOOKING BACKWARD AND THINKING FORWARD.

THE beginning of another year prompts thoughts of activities that have engaged us and of the possibilities in which we may share during the year to come.

While much preliminary work had been done in preparation for a headquarters building for the AMERICAN PHARMACEUTICAL ASSOCIATION, systematic plans were

formulated at a meeting in Washington of its Executive Committee and other members of the ASSOCIATION. At this meeting—on December 7, 1923—faith was expressed, based on what pharmacy had done and on its greater opportunities and possibilities.

Those who attended the meeting referred to, expressed confidence in the success of this important undertaking, because of what pharmacy had accomplished, and the need for greater accomplishments as a duty to maintain Pharmacy's place as a profession and a public health activity, and extend its service.

American Pharmacy was then entering upon a new and important undertaking and those interested looked back to the past, surveyed the present and considered the possibilities of the future—it resulted in a call to duty which implied that pharmacists should do no less than had been done. The expression of faith has resulted in a building on one of the most beautiful sites of Washington and the structure has been declared by the press, laity, as well as pharmacists and groups of the drug trade, as representative of the finest art and architecture.

As Chairman H. A. B. Dunning said at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION:

> "We now have ready for occupancy and use the first unit of an institution which will, we believe, develop rapidly and will become the real headquarters of professional pharmacy in this country. This unit is a credit to the ASSOCIATION and to all those who have coöperated in providing it. It illustrates what it is possible for pharmacy to do and should stimulate all of us to see that our profession is provided with such a home as is appropriate to its purposes and as will enable it to function most effectively for the American people and American pharmacists."

It is for us to look again to the past, survey the present and consider the possibilities of the future. Considering the number engaged in pharmacy, a small monthly individual contribution for the year 1934 would create an Endowment Fund which would for all time take care of overhead and running expenses of the building.

As Chairman Dunning reported:

> "The research laboratories, chemical, physical and biological, will be housed in a separate building which has been provided for and which will be erected as soon as the present building can be occupied and the questions in connection with it settled. The general plans for the laboratory building are already under consideration.
>
> "Three state associations have contributed special funds for designated purposes. The Texas Pharmaceutical Association for furnishing the offices of the Editor, the Maryland Pharmaceutical Association for furnishing the offices of the Secretary and the Kansas Pharmaceutical Association have not as yet decided for what their fund is to be used. Suitable acknowledgment will be made of these splendid contributions and it is hoped that the other state associations will make contributions for special purposes, thus emphasizing the close relations between them and the AMERICAN PHARMACEUTICAL ASSOCIATION and associating the name of each of them with the project."

The fine support given by pharmacists and drug-trade activities to the AMERICAN PHARMACEUTICAL ASSOCIATION accomplished much this year; true, it may be that the greatest results have been corrective, for properly shaping legislation, but those who have given thought to what might have been realize the great importance. The location of the headquarters in Washington will bring greater opportunities, consequent achievements and results.

SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS.—*Chairman*, L. W. Rowe, George D. Beal, F. F. Berg, C. O. Lee, E. V. Lynn, John C. Krantz, Jr., Heber W. Youngken.

A NEW FIELD OF INVESTIGATION IN PHARMACOGNOSY: THE MICROSCOPY OF GLANDULAR PRODUCTS.

BY HEBER W. YOUNGKEN AND ALLAN W. REED.

While numerous advances have been recorded in pharmacognostic investigation, new vistas opened and many refinements in technique developed during the past decade, a very important field, strange as it may seem, has apparently been overlooked. We refer to the microscopy of powdered, desiccated glandular products.

These substances of animal origin have within recent years increased in the favor of the medical profession and the amounts and kinds used have steadily enlarged. Competition between manufacturers has been keen and imminent danger of adulteration and substitution exists, since no means of identification of the altered tissue elements found in these products has been previously recorded.

It thus became obvious, if these products were to receive official recognition in our works on standards, some means for their adequate standardization would have to be provided. At the request of Chairman E. N. Gathercoal, of the National Formulary Revision Committee, the senior author was induced to try his hand in an attempt to solve what appeared to be an almost unsurmountable problem, *i. e.*, the description of the histological elements found in various of these products. The literature had been searched and no record of any results of such work could be found.

MATERIALS AND METHODS.

The glandular products examined consisted of fresh and preserved pituitary body, anterior pituitary, posterior pituitary, whole ovary, corpus luteum, desiccated strips of these and powdered, desiccated products, specially prepared from authentic materials without contamination and representing the powders of the aforementioned and ovarian residue. Cattle and hogs yielded the products.

Some of the glands were embedded in celloidin, stained, sectioned and studied under the compound microscope in comparison with figures in recognized texts on animal histology. This examination was of help in establishing the relationship of regions and tissues. But it early became apparent that the knowledge gained therefrom was of little value in identifying the altered elements in the powdered products. The next step consisted in separating layers and in teasing apart the various regions of the preserved glands and the macerated dried strips, examining these in water, and in other temporary mounts with various reagents and stains, and in comparing the histological elements observed with similarly mounted powdered, desiccated gland materials.

The reagents and stains employed included the following:

1. Delafield's hematoxylin.
2. Borrel's methylene blue.
3. Mallory's connective tissue stain.
4. Eosin and hematoxylin (1% aqueous solution of each mixed and filtered).
5. Eosin (1% aqueous solution).
6. Osmic acid (0.5% and 1% solution in distilled water).
7. Silver nitrate (1% and 3% solution in distilled water).
8. Picric acid (1% solution in distilled water).
9. Gold chloride (1 Gm. in 35 cc. distilled water).
10. Acid fuchsin (1% aqueous solution with 0.1 cc. diluted HCl added to each 100 cc. of solution).
11. Phosphotungstic acid (1% aqueous solution).
12. Hematoxylin and alum solution.
13. Acetic acid (15% aqueous solution).
14. Iodine water (ss iodine crystals in distilled water).
15. Eosin and methylene blue (1% aqueous solution of each, mixed and filtered).
16. Van Gieson's connective tissue stain (Curtis' modified method).
17. Sulphuric acid (10% and concentrated).

Both the compound and binocular types of microscopes were used in the microscopic examination of the materials in sections and powder. The dissecting microscope was employed in the separation of the layers and in teasing apart the tissues, preparatory to mounting and later study under the compound microscopes.

POWDERED DESICCATED WHOLE PITUITARY.

This occurred as a gray to yellowish gray amorphous powder with a characteristic odor and a saline and disagreeable taste.

The microscopical elements detected were as follows:

Numerous yellowish masses of polyhedral cells surrounded in parts by connective tissue, the latter staining blue with Mallory's stain; numerous large, polyhedral chromophile cells with central rounded nuclei and coarse cytoplasmic granules staining red with acid fuchsin, the nuclei colored blue and the cytoplasm reddish purple with eosin and methylene blue solution; numerous cubical to low columnar chromophobe cells with or without distinct cytoplasmic granules whose nuclei are stained light blue and cytoplasm paler blue with eosin and methylene blue, both chromophile and chromophobe cells frequently with minute fat droplets colored brown to black with 0.5% osmic acid solution; few cells containing a colloidal substance and appearing greenish in water mounts; few segments of blood vessels of tubular, hyaline nature, the cut ends of which showed serrated dark outlines when examined in silver nitrate solution; numerous mossy neuroglia fragments, the cells with spherical nuclei and elongated, branching processes; numerous elongated somewhat ovoid multipolar cells with few bluish black processes when viewed in phosphotungstic acid and hematoxylin reagent, a few small faintly basophilic, polyhedral cells from the pars intermedia with pale blue nuclei and a pink, granular cytoplasm when stained with hematoxylin and eosin; a number of angular hyaline fragments; fragments of nerve fibres with or without a bulbous end, the axons of which are colored mauve with eosin and hematoxylin; a few cells colored black with osmic acid solution; a number of spindle-shaped, bipolar nerve cells.

POWDERED DESICCATED ANTERIOR PITUITARY.

This occurs as a yellowish brown amorphous powder with a characteristic odor and saline taste. It is partially soluble in alcohol, ether, water and acetone.

The histological elements detected were as follows:

Numerous yellowish masses of polyhedral cells surrounded in parts by connective tissue, the latter staining blue with Mallory's stain; numerous large polyhedral chromophile cells with

central rounded nuclei and coarse cytoplasmic granules staining red with acid fuchsin, the nuclei colored blue and the cytoplasm red-purple with eosin and methylene blue solution; numerous cubical to low columnar chromophobe cells with or without distinct cytoplasmic granules whose nuclei are stained light blue and cytoplasm paler blue with eosin and methylene blue, both chromophile and chromophobe cells frequently with fat droplets colored brown to black with 0.5% osmic acid solution; colloidal material occurring between certain of these cells appearing greenish in water mounts; a few scattered cylindrical nerve fibres often attached to fragments of blood vessels, appearing hyaline in water mounts, their axis cylinders staining a mauve color with eosin and hematoxylin solution; few segments of blood vessels with cut ends showing crenate inner endothelial margins and best seen in silver nitrate solution; a few spheroidal cells with reddish brown lipoid content colored black with 0.5% osmic acid solution; a few fragments of colloidal substance of greenish aspect in water mounts.

POWDERED POSTERIOR PITUITARY.

This occurs as a yellowish or grayish amorphous powder with a characteristic odor and a saline, disagreeable taste. It is partially soluble in water, alcohol, ether and chloroform.

The following histological elements were detected:

Numerous fragments of neuroglia tissue with spheroidal nuclei and long, slender, branching processes best distinguished with 1% phosphotungstic acid and hematoxylin which stains the nuclei blue and the processes bluish black; numerous spindle-shaped bipolar nerve cells; a number of ovoid, multipolar nerve cells whose cell bodies sometimes contain pigment granules and whose several processes appear bluish black in phosphotungstic acid and hematoxylin mounts; fragments of nerve fibres with or without a bulbous end, some of the bulbous ends of which are surrounded by cells containing a greenish yellow colloidal substance; the axons of the nerve fibres colored mauve with eosin and hematoxylin solution; a few amyloid bodies of ovoid or crescent shape staining a deep purple with iodine water; many irregular hyaline fragments.

POWDERED DESICCATED WHOLE OVARY.

This product occurs as a pale buff to yellowish brown, amorphous powder, the predominance of yellow or brown in the color combination depending upon the ratio of corpus luteum to other ovarian substance, the species of the animal yielding the product and the period at which the ovaries were removed from the animal. It possesses an odor resembling ground mash and a salty, disagreeable taste. It is slightly soluble in water, alcohol, ether and petrolic ether.

The following histological elements were observed:

Numerous young Graafian follicles and fragments of older Graafian follicles, the young follicles appearing as spherical to oval-shaped bodies containing a central cell or oocyte which is colored deep blue with hematoxylin and alum solution; surrounding the oocyte occurs a single layer of flattened follicular cells whose nuclei are stained deep blue with Delafield's hematoxylin, while attached to parts of the follicle is a small amount of connective tissue which is colored pink with eosin solution and blue with Mallory's stain; a few scattered cubical to low columnar and transitional germinal epithelial cells occurring singly or in groups with a round central nucleus and granular cytoplasm, the granules glistening in water mounts, the nucleus staining a deep blue with Delafield's hematoxylin; a number of small, compact masses of dense, white fibrous connective tissue consisting of white collagenous fibres and fibrocytes, the fibres appearing long, narrow, transparent, with distinct, pointed ends, difficult to discern in water mounts but staining a brilliant red in acid fuchsin, the bundles of fibres showing numerous fibrillæ which exhibit a dark outline when mounted in 3% aqueous solution of silver nitrate, the fibrocytes appearing irregularly polygonal to slightly elongated, usually forked at one end in surface view and spindle-shaped in profile view, the nuclei staining a deep blue and the cytoplasm a pale blue to purplish blue with Delafield's hematoxylin; few scattered spindle-shaped, smooth muscle fibres with

centrally placed nucleus clearly visible in gold chloride T.S.; few capillaries of tubular, hyaline nature, occasionally branched and grayish to grayish black in outline with 1% silver nitrate solution; fragments of larger blood vessels with circular to oval cut ends, their endothelial layer at ends being serrated and taking a pink color with eosin and hematoxylin; occasional large spherical cells containing globules of lipoid substance which stains black with 1% osmic acid solution; scattered segments of non-medullated nerve fibres of cylindrical form and consisting of neuraxon and neurolemma, the neuraxon taking a blue color with Delafield's hematoxylin, a mauve color with hematoxylin and eosin solution and a deep red with acid fuchsin; numerous interstitial cells of rounded to ovate form, some of them slightly beaked, containing granules and shining fat globules, their nuclei staining a deep blue and their cytoplasm a pink color with hematoxylin and eosin; numerous lutein cells appearing yellow in water mounts; when the material contains corpora lutea, the cells large, polyhedral to oval, often in masses, each containing a central nucleus, lutein granules and fat droplets.

When 1 Gm. of powdered desiccated whole ovary is mixed with water to form a smooth paste and about 0.5 cc. of sulphuric acid is added to this paste, a reddish brown to deep red color is produced within 15 seconds.

POWDERED DESICCATED OVARIAN RESIDUE.

This represents the whole ovary from which the corpus luteum has been separated by means of a scalpel, ground, dried, powdered and sifted. But the perfect separation of corpus luteum is not always carried out in practice.

The powder, therefore, contains the same elements as that of powdered, desiccated whole ovary but only a relatively small number of lutein cells.

It may also be distinguished from powdered, desiccated whole ovary by the following test:

When 1 Gm. of ovarian residue is mixed with 1 cc. of sulphuric acid, a yellowish green or fig color is produced.

Upon the addition of about 0.5 cc. of old ammonium polysulphide to this mixture, a yellow color is produced which immediately changes to white.

POWDERED DESICCATED CORPUS LUTEUM.

A yellow- to buff-colored amorphous powder with a characteristic, malt-like odor and a saline taste. It is partly soluble in water, alcohol, petrolic ether and ether. The color varies with the stage of pregnancy of the animal and with its age.

The histological features of this product are as follows:

Numerous hypertrophied, yellowish lutein cells occurring singly or in small groups or irregular masses, the lutein cells polyhedral, ovoid, oblong to irregularly elongated with a rounded, central nucleus staining deep blue and cytoplasm staining purple with Delafield's hematoxylin, many of these cells containing fat globules and lutein granules which take a black color with 0.5% osmic acid, the lutein cells and granules staining greenish to greenish blue in 10% sulphuric acid; between various lutein cells in a clump occur connective tissue septa which are colored deep red with acid fuchsin and bluish with Mallory's stain; occasional capillaries of cylindrical shape, sometimes branched, hyaline, and showing black outlines in 1% silver nitrate solution; occasional fragments of large blood vessels whose severed ends exhibit a serrate or crenate endothelium; very few non-medullated nerve fibres, the axon-colored mauve with eosin and hematoxylin, the fibrillæ clearly seen in phosphotungstic acid and Mallory's stain; a few spindle-shaped, smooth muscle fibres with central nucleus colored deep blue with hematoxylin; a number of amyloid bodies colored purple to violet with iodine water; a faint yellow, colorless crystalline substance.

Grateful acknowledgment is made to the Wilson Laboratories and to Armour & Co. for the glandular products used in this research.

MASSACHUSETTS COLLEGE OF PHARMACY, BOSTON.

NOTES ON THE WATER OF CRYSTALLIZATION OF QUININE SULPHATE.*,[1]

BY GEORGE DENTON BEAL[2] AND CHESTER R. SZALKOWSKI.[3]

INTRODUCTION.

According to U. S. P. X, quinine sulphate contains "7 or 8 H_2O," and "effloresces rapidly when exposed to dry air or when heated to 50° C., losing all but two molecules of its water of crystallization and becoming lusterless." Among the "Tests for purity," we read: "Quinine sulphate loses not more than 16.2 per cent when dried to constant weight at 100° C. (*water*)."

Inquiry among pharmacists developed the fact that the U. S. P. description, rubric and directions for storage in well-closed containers were not regarded as of serious moment. As a matter of fact, this instability of the water of crystallization is seldom mentioned in pharmaceutical literature. Cownley[4] says that while it is generally stated that anhydrous quinine sulphate is only obtained at temperatures exceeding 110° C., his carefully controlled experiments show that the salt readily became anhydrous at 100° C., and that when freely exposed to the air in the anhydrous state it rapidly absorbs water to become a dihydrate. The freshly crystallized salt contains 7 to 8 molecules of water, and when exposed to the air it rapidly effloresces to the dihydrate.

H. B. Parsons[5] reported the water of crystallization of 1015 samples of quinine sulphate as determined by him. One Gm. of each was dried in the water oven for three hours with the following results:

Brand.	No. Samples.	Average Percentage Moisture.
American	16	13.72
American	184	12.61
German	12	12.32
German	634	14.19
Italian	169	14.36

Each sample reported represented 100 ounces from a previously unopened can. The differences above noted in the water of crystallization in the five brands reported were said to be tolerably constant and characteristic for each brand.

W. A. Spalding[6] weighed the contents of two quinine sulphate containers and repeated the weighings at intervals extending over twelve months for the first and eight months for the second. He observed a constant loss, 8 to 9 per cent for the first and 11.39 per cent for the second.

F. A. Thompson[7] found an average moisture content of 11.74 per cent in 183 samples, all of which responded to the other U. S. P. tests for purity.

---

* Scientific Section, A. PH. A., Madison meeting, 1933.

[1] Published by permission of the Chairman of the Committee of Revision, U. S. P. XI.

[2] Assistant Director, Mellon Institute of Industrial Research, Pittsburgh, Pa.

[3] Assistant in Research in Pure Chemistry, Mellon Institute.

[4] *Pharm. J. Trans.* (Sept. 2, 1876), 189.

[5] PROCEEDINGS, A. PH. A., 32 (1884), 457.

[6] *Ibid.*, 34 (1886), 605.

[7] *Ibid.*, 40 (1892), 267.

C. E. Sage[1] obtained two one-ounce bottles, one of which was opened and a little removed from time to time throughout two years, the other bottle kept sealed, and the two stored side by side. When finally assayed, the opened bottle contained 3.76 per cent of water while that in the sealed bottle contained 13.28 per cent. He also states that globules of water have been found condensed on the walls of tins containing quinine sulphate.

Reference has occasionally been made to original packages of quinine sulphate that were apparently under weight, or slack-filled. Comments have also been passed upon a change in appearance of the salt, whereby the long flaky crystals, so popular with those who gage their dose by apparent volume, have changed their form to short needles that have almost the appearance of a fine powder. Instances are also known where inspectors having prescriptions filled for subsequent analysis and possible prosecution have found said prescriptions as compounded to contain an unduly large amount of quinine, as much as 13 per cent in excess of the prescribed quantity being reported. The previously published articles suggest that these conditions are due to the ready loss of water of crystallization from quinine sulphate. We have been interested in determining the conditions and extent of this loss, and wish to report in part our studies to date.

EXPERIMENTAL.

Through the courtesy of C. Leonard O'Connell, of the Pittsburgh College of Pharmacy, and E. Fullerton Cook, of the Philadelphia College of Pharmacy and Science, Samples 1 to 15 were obtained from drug stores in Pittsburgh and 16 to 26 from the various laboratories of the Philadelphia College of Pharmacy. Samples 27 and 28 came from recently purchased, unopened containers obtained by the Department of Research in Pure Chemistry at Mellon Institute. Samples of approximately 1 Gm. were accurately weighed from tightly stoppered weighing bottles into tared porcelain dishes and dried in an electric oven at 100° C. until the weights became constant. The dishes were removed to desiccators for cooling at the end of two hours, weighed and returned to the oven to be reheated for another hour. No change in weights was observed as a result of the second drying.

TABLE I.—WATER OF CRYSTALLIZATION IN COMMERCIAL QUININE SULPHATE.

Sample No.	Description.	Per Cent Water.	Molecules Water.
1	From 1-oz. container. Very fine powder	4.39	1.9
2	Stock bottle. Very fine, glistening crystalline powder	5.73	2.5
3	Stock container. Fine silky needles	10.90	5.0
4	New container. Fine silky needles	9.66	4.4
5	Stock bottle. Very fine, silky needles	8.34	3.7
6	Stock bottle. Very fine, glistening powder	5.04	2.3
7	Stock bottle. Very fine, glistening powder	5.72	2.4
8	Glass-stoppered bottle. Very fine, glistening needles	7.45	3.3
9	Freshly opened can. Fine silky needles	12.27	5.8
10	Open stock container. Fine glistening powder	5.09	2.4
11	Open stock container. Fine glistening powder	4.69	2.0
12	Stock bottle. Fine glistening powder	4.61	2.0
13	Stock container. Fine glistening crystalline powder	6.56	2.9
14	Stock container. Fine glistening powder	4.72	2.0

[1] *Pharm. J.*, 119 (1927), 264.

15	Opened stock container. Very fine, silky needles	5.94	2.6
16	Original unopened container. 2 years old. Fine silky needles	4.77	2.1
17	Original unopened container. 2 years old. Fine silky needles	4.94	2.0
18	Stock bottle. Old. Fine glistening powder	4.57	1.9
19	Stock bottle. Old. Fine glistening powder	4.64	2.0
20	Stock bottle. Very fine, silky needles	5.19	2.2
21	Stock bottle. Fine silky needles	5.22	2.3
22	Original container. Opened 1 month. Very fine, silky needles	10.67	4.9
23	Original container. Unopened. Fine silky needles	10.78	5.0
24	Original container, screw cap. Fine silky needles	9.65	4.4
25	Original container. Unopened. Fine silky needles	5.78	2.5
26	Stock bottle. New. Fine silky needles	7.35	3.2
27	New 50-oz. can. Silky, glistening crystals	12.20	5.7
28	Five-oz. metal can. Six months old. Unopened. Fine silky powder	4.63	2.0
27-B	Sample 27 in glass-stoppered bottle 2 weeks. Fine glistening crystals	11.60	5.4
28-B	Sample 28 in lightly stoppered bottle 2 weeks. Fine silky powder	4.66	2.0

Samples of anhydrous quinine sulphate and of quinine sulphate octahydrate were prepared from Sample 28. The anhydrous sample was prepared by drying to constant weight in an oven at 100° C. A portion of the anhydrous salt was dissolved in boiling distilled water and the solution allowed to cool slowly, when the salt crystallized. The mother liquor was separated from the crystals on a Büchner funnel, the wet crystals transferred to a porcelain dish and partially dried at about 80° C. The dish was then cooled for one hour in a desiccator over 1:1 sulphuric acid. A sample of about 1 Gm. lost about 50 per cent in weight when dried at 100° C. The bulk of the crystals was returned to the oven at 80° C. for thirty minutes, cooled, the moisture determined, and these operations repeated until 16.78 per cent of water remained, corresponding to approximately 8.4 molecules. The mass of crystals was thoroughly mixed before sampling for subsequent experiments. The anhydrous sample will be designated hereafter as "A" and the recrystallized sample as "R."

The stability of the water of crystallization and the tendency of the salt to absorb water were determined by exposing weighed portions of 27-B, 28-B, A and R to various humidities, at laboratory temperature, 23° to 25° C., until the weights of the various portions became constant. The test portions were exposed in flat dishes in desiccators containing concentrated sulphuric acid, 3:1 sulphuric acid, 2:1 sulphuric acid, 1:1 sulphuric acid, saturated solution of potassium acetate (20 per cent humidity), saturated solution of calcium chloride (30 per cent humidity), saturated solution of potassium carbonate (40 per cent humidity), and saturated solution of ammonium chloride (80 per cent humidity). All samples were exposed to their particular atmosphere for three hundred and thirty-six hours, or fourteen days, and were weighed daily. In no instance was there any pronounced change after the ninth day.

The percentage loss in weight of these samples is given in Table II. The figures in the first line for each sample indicate the percentage loss of weight at that particular humidity (gain in weight with Sample A). The second line of figures represents the result of the subsequent moisture determination, heating at 100° C. for two hours. The third line of figures, for Samples R, 27-B and 28-B,

represents the total loss in weight of the sample, or, in other words, its water of crystallization.

TABLE II.—DETERMINATION OF WATER OF CRYSTALLIZATION OF QUININE SULPHATE AT VARIOUS HUMIDITIES.

Sample.	Original Water.	Lab. Hum. %	H_2SO_4 %	3:1 H_2SO_4 %	2:1 H_2SO_4 %	1:1 H_2SO_4 %	20% Hum. %	30% Hum. %	40% Hum. %	80% Hum. %
A	0	+ 4.95	+ 1.15	+ 4.15	+ 4.63	+ 4.68	+ 5.15	+ 5.18	+ 5.11	+ 5.10
		− 4.97	− 1.33	− 4.00	− 4.61	− 4.76	− 5.15	− 5.22	− 5.17	− 5.22
R	16.78	−10.60	−11.90	−11.85	−11.68	−11.15	−11.12	−11.70	−10.52	− 3.38
		− 5.00	− 4.78	− 5.08	− 5.20	− 4.96	− 5.01	− 5.14	− 6.28	−13.50
		−15.60	−16.68	−16.93	−16.88	−16.11	−16.13	−15.84	−16.80	−16.88
27-B	11.60	− 6.70	− 6.98	− 6.88	− 7.00	− 6.50	− 7.20	− 7.05	− 6.66	− 2.68
		− 5.12	− 4.59	− 4.88	− 5.18	− 4.51	− 5.25	− 5.10	− 5.76	− 9.15
		−11.82	−11.57	−11.76	−12.18	−11.01	−12.45	−12.15	−12.42	−11.83
28-B	4.66	− 0.04	− 0.03	− 0.07	− 0.005	− 0.002	0.00	0.00	0.00	0.00
		− 5.30	− 4.80	− 5.06	− 5.03	− 5.21	− 4.05	− 4.48	− 5.34	− 5.48
		− 5.34	− 4.83	− 5.13	− 5.035	− 5.212	− 4.05	− 4.48	− 5.34	− 5.48

+ Indicates increase in weight.
− Indicates loss in weight.

CONCLUSIONS.

Although some discrepancies appear in the preceding table, these particular determinations have not been repeated, as our purpose at this time has only been to determine the trend of the dehydration or hydration.

Examination of the data in Tables I and II will indicate the tendency of this salt to form a stable dihydrate. The per cent of water in the dihydrate is 4.60, in the heptahydrate 14.43, and in the octahydrate 16.16. This tendency is in agreement with the U. S. P. description, which states that when exposed to dry air or when heated to 50° C. it loses all but two molecules of its water of crystallization.

The tendency of quinine sulphate U. S. P. to dehydrate is marked, and it behooves pharmacists to buy quinine sulphate only in small, tightly closed containers, to store them in a cool place, and to keep the packages tightly and imperviously stoppered between the occasions of their use.

Quinine sulphate of less than U. S. P. water content may be easily converted to the dihydrate by exposure to dry air or by heating at 50° C.

PITTSBURGH, PA.,
September 19, 1933.

THE DETECTION OF SMALL QUANTITIES OF CARBON MONOXIDE IN MEDICINAL OXYGEN.*

BY JACOB E. SCHMIDT AND JOHN C. KRANTZ, JR.

INTRODUCTION.

The detection and quantitative determination of small quantities of carbon monoxide in air and blood have been the subject of much investigation during the last three decades. However, little attention has been centered on the detection

* The expense of this investigation was defrayed in part by a grant from the Research Fund of the AMERICAN PHARMACEUTICAL ASSOCIATION.—Scientific Section, A. PH. A., Madison meeting, 1933.

of this dangerous impurity in medicinal oxygen. Owing to the fact that the principal source of medicinal oxygen is through the fractional distillation of liquefied air, the presence of small quantities of carbon monoxide is indeed a possibility.

The principal methods employed for the determination of carbon monoxide in air are the Orsat (1), Blood Colorimetric (2), Blood Spectroscopic (3), Blood Pyrotannic Acid (4) and Teague's (5) Iodine Pentoxide Method. Those methods involving the use of blood are well established and simple in manipulation. However, the sensitiveness of these methods is materially reduced when the dispersion medium of the carbon monoxide is pure oxygen and not air as shown by the following considerations.

When equilibration is established between CO and O_2 in the presence of hemoglobin the factors controlling the amount of carbon monoxide hemoglobin formed are the partial pressures of the two gases and the respective affinity (a) of the gases for hemoglobin.

Therefore

$$\frac{HbCO}{HbO_2} = \frac{pCO \times aCO}{pO_2 \times aO_2}$$

Prince (6) setting the affinity of O_2 for hemoglobin at unity found the affinity of CO for hemoglobin to be 300, then

$$\frac{HbCO}{HbO_2} = \frac{300\ pCO}{pO_2}$$

With air pO_2 = 20.93 per cent or 2093 parts per 10,000 but with oxygen the equation becomes

$$\frac{HbCO}{HbO_2} = \frac{300\ pCO}{10{,}000}$$

This indicates that the sensitivity of the test is reduced approximately fivefold when oxygen is the dispersion medium.

Teague's modification of the iodine pentoxide method as further modified by Martinek and Marti (7) was studied. The latter investigators were forced to use many scrubbing bottles to free the air from hydrocarbons and other contaminating substances from the exhausts of internal combustion engines. The present authors found it possible to obviate much of this scrubbing as these impurities do not occur in medicinal oxygen. In this manner the test was simplified for Pharmacopœial purposes.

EXPERIMENTAL.

The iodine pentoxide method depends upon the passing of the dry gas containing the carbon monoxide over purified iodine pentoxide heated to 150° C. The gas bubbles, then, through a potassium iodide solution containing starch T.S. The iodine formed by the reduction of the iodine pentoxide is vaporized and passes into the potassium iodide solution.

The assembled apparatus is shown in the illustration.

A and B are made of glass tubing having an internal diameter of about 3 mm. They are filled to a height of about 5 cm. with iodine pentoxide which has been heated at 215° C. for 3 hours. Each tube is heated by the paraffin baths E and F which are kept constant throughout the test at a temperature of 145° to 155° C. by means of the heaters G and H. C and D are drying tubes filled with calcium chloride. I is a tube having a capacity of about 50 cc. and con-

taining about 25 cc. of potassium iodide T.S. J and K are two-way stop-cocks by means of which the gas to be tested may be made to pass through the tubes D, B and I or through tube M. N is a 25-cc. beaker containing 10 cc. of potassium iodide T.S. and 3 drops of starch T.S.

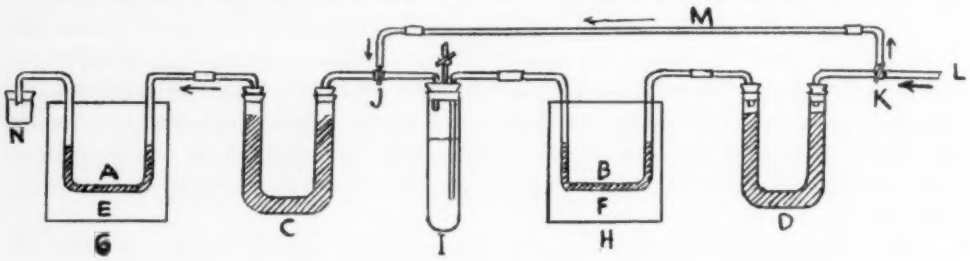


Fig. 1.

PRELIMINARY TREATMENT OF THE IODINE PENTOXIDE.

When the apparatus is assembled first or when it has not been in use for some time, a preliminary treatment of the iodine pentoxide prior to proceeding with the test is often necessary in order to prevent its spontaneous decomposition with the liberation of iodine, which may lead to erroneous conclusions.

Connect the oxygen supply with the inlet L, and adjust the stop-cocks J and K so as to include tube M. Heat bath E to about 215° and bath F to about 150° and pass oxygen through the apparatus allowing it to bubble through the solution in N at the rate of about one bubble every two seconds. Continue for about three hours. Reduce the temperature of bath E to about 150° and pass 10 liters of oxygen in from 50 to 60 minutes allowing it to bubble into a fresh solution in N. If the solution in N is colored blue or purple, raise the temperature of bath E to 215° and proceed as before. If no coloration is produced in N, the test may be begun.

THE TEST.

Connect the oxygen supply with the inlet L, and adjust the stop-cocks J and K so as to exclude tube M. Heat the paraffin baths to from 145° to 155°. Pass the oxygen through the apparatus, allowing it to bubble through the solution in N at such a rate that 10 liters will pass in from 50 to 60 minutes. At 10-liter intervals replace the solution in N, if it has acquired a blue or purple color. Continue the passage of the gas until a 10-liter volume produces no coloration in a fresh portion of the solution in N. Turn the stop-cocks so that the oxygen will pass through tube M, and, having poured a fresh solution into N, pass 5 liters of the gas (at the same rate). The solution in N is not colored blue or purple (carbon monoxide).

In this laboratory carbon monoxide was generated by the action of sulphuric acid on C.P. formic acid. One-tenth-cc. and 0.05-cc. quantities, respectively, were collected over water in an especially designed capillary pipette. The pipette containing the gas was transferred to a flask containing 5 liters of oxygen and agitated vigorously using about a liter of water to afford intimate mixing.

RESULTS.

(*a*) Seven trials showed definite positive tests 1–50,000.
(*b*) Five trials showed definite positive tests 1–100,000.

(*c*) Blank trials showed no liberation of iodine.

The test was conducted using pure nitrogen as the dispersion medium instead of oxygen. This apparently did not augment the amount of iodine liberated.

CONCLUSION.

1. A simple test, requiring no gas free from carbon monoxide for scrubbing purposes, for the detection of carbon monoxide in medicinal oxygen has been devised.
2. The sensitivity of the test is in the order of 1–100,000.

The authors wish to express their indebtedness to the Linde Air Products Company of Buffalo for the supplying of oxygen and nitrogen, and also to their chief engineer, Dr. Leo I. Dana, for his criticism and advice during the course of this investigation.

REFERENCES.

(1) W. W. Scott, Standard Methods of Chemical Analysis, D. Van Nostrand (1917), page 697.

(2) J. B. S. Haldane, *J. Physiol.*, 22 (1897), 139.

(3) "Vogel's Spectroscopic Method in Technical Methods of Chemical Analysis," edited by George Lunge, through Martinek and Marti.

(4) R. R. Sayers and W. P. Yant, Bureau of Mines, *Technical Bull.*, 373.

(5) M. C. Teague, *J. Ind. Eng. Chem.*, 12 (1920), 964.

(6) A. L. Prince, "The Combination of Carbon Monoxide and Hemoglobin and Its Analytical Application," N. Y. State Bridge and Tunnel Comm., Sec. 9, App. 4 (1921), 188, through Sayers and Yant.

(7) M. J. Martinek and W. C. Marti, *Am. J. Pub. Health*, 19 (1929), 293.

BUREAU OF CHEMISTRY,
STATE OF MARYLAND,
DEPARTMENT OF HEALTH.

LICORICE FERN AND WILD LICORICE AS SUBSTITUTES FOR LICORICE.*

BY LOUIS FISCHER AND E. V. LYNN.

A preliminary study reported by one of us three years ago (1) indicated the possibility of using the rhizomes of licorice fern, *Polypodium vulgare* L. **var** *occidentale* Hook, in place of the official licorice. We have now completed that study and find increasing evidence for this substitution.

In the meantime attention was called to the common occurrence of wild licorice, *Glycyrrhiza lepidota* (Nutt.) Pursh. Apparently as an outcome of suggestions made at the annual convention of this ASSOCIATION in 1887, McCullough (2) reported an examination of the rhizomes. He found 8.53 per cent of ammoniated glycyrrhizin and 6.39 per cent of the crude acid, which differed considerably in taste from the compound as obtained from licorice.

From the published citations, one would conclude that the rhizomes are similar to those of licorice. Furthermore, we learn that they have been used as a

* Scientific Section, A. PH. A., Madison meeting, 1933.

tonic by the Pah Ute Indians (3) and that the whites have chewed them in place of tobacco. We are quite puzzled by this situation because our material was bitterish and rather salty, but not sweet and with little resemblance to licorice.

The specimens used by us were identified by Prof. George Neville Jones of the University of Washington. The licorice fern was collected in and near Seattle, the wild licorice near The Dalles, Oregon, in June 1929. The materials were well cleaned, thoroughly dried in air at about 35° C. and ground to fine powders. Proximate analyses gave the following results in percentage, all except the loss of volatile matter being based on the dried sample. The methods used are described in the previous paper (1).

TABLE I.

	Licorice Fern. Rhizomes.	Licorice Fern. Leaves.	Wild Licorice. Rhizomes.
Loss in air	75.63	74.38	58.97
Loss at 110° C.	79.17	77.10	59.94
Total ash	2.69	6.15	5.18
Acid-insoluble ash	0.27	0.08	0.55
Soluble in ether	7.32	...	1.67
Soluble in chloroform	7.71	...	1.75
Soluble in ethyl acetate	15.59	...	3.66
Soluble in alcohol	35.81	...	14.28
Soluble in water	41.19	...	27.88
Selective extraction			
Petroleum ether total	6.07	3.06	1.41
Non-volatile	6.04	2.88	1.13
Ether total	2.59	3.61	0.94
Non-volatile	2.18	3.48	0.76
Chloroform	1.08	1.69	0.46
Ethyl acetate	2.27	4.16	1.49
Alcohol	21.36	15.57	13.14
Reducing sugars	4.22	17.00	2.29
Sucrose	15.51	0.66	3.64
Starch (Hooker)	6.29	...	3.49
Pentosans (Spoehr)	6.22	...	12.19
Pentosans (A. O. A. C.)	7.75	...	14.63
Nitrogen × 6.25	9.00	...	...
Tannin	2.46	...	None
Alkaloid	None	None	...

The amounts of sugars, starch and tannin are subject to considerable variation with the seasons as would be expected. Sucrose was isolated from all three materials and identified by melting point, specific rotation and ultimate analysis: Found carbon 42.03, hydrogen 6.41; calculated 42.08 and 6.48 per cent.

The leaves of licorice fern were found to contain starch-splitting enzymes using a method previously described for the rhizomes. There are also present in both materials enzymes which will split beta-glucosides.

GLYCYRRHIZIN.

In the present investigation great doubts were early presented on previous presumptions that glycyrrhizin is contained in the rhizomes of either plant. For estimation of its amount there were used the method (I) of Housemann (4) and one (II) which is a modification of several which are found in the literature. The latter is as follows:

Fifty grams of sample were macerated for six hours with diluted ammonia (1:19) and then percolated with additional water until 500 cc. of liquid were obtained. Exactly half of this was treated with excess of dilute sulphuric acid and allowed to stand over night in an ice box. The filtered precipitate was well washed with ice-water, redissolved in the diluted ammonia and again precipitated with acid. After repeating this process once more, the final ammoniacal solution was evaporated and heated to constant weight.

	I.	II.	
Licorice	6.71	11.43	Sweet and light brown
Wild licorice	7.48	9.72	Slightly bitter and light brown
Licorice fern	1.11	9.34	Tasteless and red-brown

The most striking feature was the difference in taste of the residue. Assuming, as seems unavoidable, that all of the glycyrrhizin is present as ammonium salt, the conclusion is that in licorice alone is there more than a mere trace.

The increased amounts in Method II apparently arise in the absence of preliminary extraction by strong alcohol. In order to confirm this, the process was repeated using such a preparatory extraction as outlined by Housemann (4). The results were: Licorice, 7.89; wild licorice, 8.39; licorice fern, 1.87.

It may be concluded, therefore, that neither of the last two contains more than a trace of glycyrrhizin. The former gives as much residue as licorice, but this is without sweet taste, and the much smaller amount from licorice fern is also without sweetness.

As further confirmation, all three were submitted to the process for purification by Tschirch and Cederberg (5). Licorice yielded the characteristic sweet acid which was further purified by crystallization from hot acetic acid. The others, however, gave no crystalline material at all and nothing which corresponded to glycyrrhizic acid. It is interesting to note that the materials obtained from wild licorice were quite bitter throughout.

The absence of glycyrrhizin from these plants again emphasizes the fallacy of drawing conclusions after the usual quantitative methods, and the reports of finding this substance in various plants is usually based upon no other evidence. Because such methods of reasoning proved erroneous here, one could justifiably assume that there must be serious doubts in all other cases, except where the substance was actually isolated and analyzed, as was done by Tschirch for *Periandra dulcis* and for monesia bark.

LEAVES OF LICORICE FERN.

A large quantity of the leaves was exhausted by hot alcohol which, upon cooling, gave 0.86 per cent of a flocculent yellowish precipitate. The solvent was mostly removed from the alcoholic solution by distillation under reduced pressure and the residue was submitted to distillation by steam.

Benzoic Acid.—The distillate, which was acid in reaction, was completely extracted with ether. After drying and removing the solvent by spontaneous evaporation, there was left a crystalline residue which, after purification, melted at 120° C. Solubility and other properties accorded with those of benzoic acid and this was confirmed by converting to ethyl benzoate. The remainder of the distillate still contained acid corresponding to 0.05 per cent of the drug, as determined by titration and calculated for acetic acid. Incidentally benzoic acid was also found in the distillate from wild licorice rhizomes.

Salicylic Acid.—The thick, green residue from distillation by steam was extracted with ether in which only a portion dissolved. From the ether solution 10 per cent solution of ammonium carbonate withdrew more benzoic acid and some salicylic acid, which gave a violet color with ferric chloride and was also converted to methyl salicylate.

Phytosterol.—The residual solution in ether was evaporated to dryness, leaving a black oil. From this hot dilute alcohol extracted a small amount of a crystalline solid, melting point 132–133° C., which gave a white precipitate with digitonin decomposing at 211–212° C. It also responded to the various tests for phytosterol (Schiff, Moleschatt, Salkowski, Burchardt-Liebermann, ferric chloride) and was not saponifiable.

The aqueous solution left upon distillation with steam was found to contain a nitrogenous base and the sugars. Neither this nor the resins were examined further.

Substance Melting at 74° C.—The flocculent material which separated from the original alcoholic solution was purified by crystallization from hot alcohol containing charcoal. It was then perfectly white and melted at 73–74° C., dissolved easily in benzene but only partly so in other solvents and not at all in water or cold alcohol. The substance was not affected by boiling dilute acids or alkalies and did not react with semicarbazide or with benzoyl chloride. Combustion of several samples gave 80.65 per cent of carbon and 12.80 per cent of hydrogen, leaving 6.55 per cent of oxygen. Evidently it cannot be a hydrocarbon, although its inactivity to reagents might so indicate. The small amount of material available prevented any further investigation of this interesting substance.

RHIZOMES OF LICORICE FERN.

During the preliminary extractions it was noted that a substance separated from ethyl acetate on cooling. Later it was found that a preliminary treatment of the rhizomes with chloroform to remove oil and some resin and subsequent extraction with hot ethyl acetate resulted in a white product. The total amount was about 9 per cent of the dry rhizome.

It was sweet and somewhat bitter, soluble in hot water to give a slightly turbid or clear solution on cooling, also in alcohol and fairly so in acetone, but insoluble in other usual solvents. The melting point varied with each batch, somewhere between 90° and 135° C., always with more or less decomposition. Calculated as reducing sugar, the Munson-Walker method showed 15 per cent before hydrolysis and about 45 per cent after. Sucrose could be separated and identified by its melting point, by the specific rotation of +67.2°, and by an ultimate analysis.

An alcoholic solution of the materials was precipitated by ether and the product was dissolved in hot water. Neutral and basic lead acetate were added in excess and the resulting precipitate was suspended in water and treated with hydrogen sulphide. Evaporation of the filtrate gave a small quantity of brownish residue which was free from sugars and possessed a characteristic taste. That it was mixture was concluded from the melting point; there was some darkening at 110° C. but no complete melting below 140° C. Judging from various experiments, it was apparent that the original substance from ethyl acetate contained, in addi-

tion to sugars, a mixture of compounds in small amounts which are, with the sweetness, responsible for the taste and give the resemblance to licorice. The amount present in the rhizomes is too small to be of any importance except to impart this taste.

Polydin.—An alcoholic extract of the rhizomes was concentrated under reduced pressure to a small volume and precipitated by adding eight times as much ether. After standing for several days, the clear supernatant liquor was decanted and evaporated to a small volume. Crystallization set in after about a week to give ultimately 0.75 per cent. The substance obtained was soluble in alcohol, in acetone, in hot water or in spirit of ether, but only partially in hot ethyl acetate and insoluble in chloroform or ether. Purified by repeated recrystallization from a mixture of acetone and water, it was finally obtained in the form of rosettes, melting sharply at 188–189° C. It had no effect on Fehling's solution until after hydrolysis by hydrochloric acid, when it gave an abundant reduction. The addition of ferric chloride to an aqueous solution gave a greenish blue color which could not be obtained in the presence of much acid. Phosphotungstic acid gave to an alkaline solution a blue color. Both of these reactions are characteristic of arbutin which was also indicated by the melting point.

A small portion was suspended in water under an equal volume of ether and hydrochloric acid was added drop by drop over a period of two days, when the mixture was clear. The ethereal solution was separated, dried with anhydrous sodium sulphate and evaporated, leaving a white substance which melted at 167° C. Physical comparison showed that this was not hydroquinone, melting at 169° C., and no quinone could be obtained upon oxidation. From the aqueous solution there was obtained apparently a mixture of osazones, one of which was similar to that of lactose. Hydrolysis of the glucoside, therefore, resulted in a compound melting at 167° C. and one or more sugars.

Ultimate analysis of highly purified samples of the glucoside gave as average carbon 56.32, hydrogen 5.42, per cent. Since it seems to correspond with none so far recorded in the literature, the name polydin is suggested for it. The available material was too small to permit further examination and its minor relation to the problem in question did not appear to warrant additional work.

One experiment was made, however, to see if polydin is potent. A white rat was fed 0.15 Gm. representing 0.8 Gm. per Kg. of body weight. Although this corresponds to approximately two ounces for an average adult person, yet there was no apparent effect on the rat.

Comparative Galenicals.—In the earlier report (1) a series of preparations was made which compared rather unfavorably in taste with those from licorice. In view of our discovery that a previous extraction with chloroform will remove at least a part of the bitter taste, we have repeated these preparations on material which had been so treated. The taste in general was notably improved; the bitterness was not as noticeable and the preparations possessed a smoother and more palatable taste, but they were still somewhat inferior. Addition of certain aromatics, however, gave entirely suitable products and we have no doubt that satisfactory formulas could readily be devised.

Cultivation.—Since the winter of 1929 experiments have been made in growing the fern. Specimens were collected from several places, leaving the plant wholly

intact and with a portion of the moss upon which it grew. These were planted in a frame containing rich, well-fertilized soil and the frame was covered with small panels about 1.5 inches wide and spaced the same distance apart to allow a partially shaded condition. One-half of the frame was then covered with burlap to keep any direct sunshine from the growth underneath.

The plants began to grow immediately but very slowly. Over the period of four years the leaf-growth has been very heavy but the rhizomes are short and compact and do not compare in length with those which have been observed in a natural habitat. The leaves of the plants covered with burlap have been greater in number, more fully developed and of a rich green color, while the leaves not so covered but in similar soil have been shorter, not as thick, and pale green.

In other experiments portions of the rhizome, about 2 to 2.5 inches in length and each containing a growing tip, were planted under various conditions. The first group was planted in soil obtained from their natural surroundings, the second in moss surrounded with rich, loamy soil, the third in the loamy soil originally in the cold frame. After one year the rhizomes were found to have grown from one to two inches, but in none was there a great amount of leaf development.

After the four years of experience in these studies, we are convinced that commercial production would be entirely practicable. It is true that growth is slow under any of the conditions used and that duplication of natural environment would not be feasible. Nevertheless, cultivation could be accomplished under almost any circumstances and determination of the best conditions should be a simple matter. The licorice fern can undoubtedly be grown and harvested at a price far under that of Russian or Spanish licorice. We urge further study of this interesting problem.

SUMMARY.

The rhizomes of wild licorice contain benzoic acid and sucrose but no glycyrrhizin.

The leaves of licorice fern contain sucrose, benzoic and salicylic acids, a phytosterol and an unidentified substance melting at 74° C.

The rhizomes contain no glycyrrhizin in spite of the characteristic, licorice-like taste which was found due to sugars, including sucrose, plus a small amount of an unidentified substance. They contain also a glucoside, which is named polydin, but no alkaloids.

The rhizomes can be used satisfactorily in place of licorice in medicine, especially if previously extracted with chloroform. Experiments in cultivation have indicated that commercial production to economical advantage is very possible.

REFERENCES.

(1) Fischer and Goodrich, THIS JOURNAL, 19 (1930), 1063.
(2) McCullough, *Am. J. Pharm.*, 62 (1890), 388.
(3) Palmer, *Ibid.*, 50 (1878), 591.
(4) Housemann, *Ibid.*, 93 (1921), 478.
(5) Tschirch and Cederberg, *Arch. Pharm.*, 245 (1907), 97.

SEATTLE, WASHINGTON,
June 20, 1933.

THE PIGEON AS A HEMATOPOIETIC TEST ANIMAL.*

BY WM. A. PEABODY[1] AND R. C. NEALE.

The need of a dependable laboratory assay method for the antipernicious anemia principle has been obvious for some time. Vaughan, Muller and Zetzel (1) in 1930 described the use of grain-fed pigeons as test subjects. Orally or parenterally, effective liver extracts gave marked increase in pigeon reticulocyte percentages without significant rise in red blood cells or hemoglobin. Normal saline, histamine, vitamins B_1 and B_2, human gastric juice and casein gave essentially negative reticulocyte responses. Beef steak gave results similar to those from liver, while leucine produced suggestive effects although known to be negative clinically. Recently Edmunds, Brueckner and Fritzell (2, 3) reported encouraging results with this method.

The present study was undertaken to learn more about the practicability of the test and its specificity for the principle in question. The effects of injecting normal saline, leucine, histidine, tryptophane, ash of liver extract and several intramuscular liver preparations were chosen for investigation. Histidine and tryptophane were included because of the claim of Fontes and Thivolle (4) that these amino acids together are the essential factors lacking in primary anemia. Determinations of erythrocyte and hemoglobin levels were not contemplated, but they were followed in a number of experiments after it was noticed that long confinement on the rather restricted diet apparently produced subnormal blood conditions.

METHODS.

General.—Birds were taken without reference to sex or breed, and caged singly or in pairs. Diet was restricted throughout to the mixed grain, and water. In the earlier experiments, weights and reticulocyte percentages were determined at intervals during the fore-periods as well as the experimental periods. Later, weighings were made only for the purpose of comparing the dosages per unit of body weight. Most injections were made after the initially high (around 20%) reticulocyte levels had subsided to 11–15% and were fairly constant or only slowly changing. The counts were made at one- to two-day intervals just preceding and throughout the injection periods, but at longer intervals after recession of the reticulocyte curves from their peaks. When red cell and hemoglobin were determined, samples were taken shortly before injection, at or near the peak of the reticulocyte rise, and again about a week later.

Blood Collection and Staining.—Blood samples were taken at about the same hour in the morning, always before injections. One or two drops of blood from a wing vein were mixed in small glass cups with about twice that volume of a solution of 0.85% NaCl containing about 1% potassium oxalate. Smears, two for each sample, were spread by the slide method, with a spreading-slide having smoothly ground, beveled edges. The present procedure was developed when it was found that the use of brilliant cresyl blue, before or after drying of the smear, with or without alcohol fixation or the use of Wright's stain, variously caused the pigeon erythrocytes to hemolyze, fragment or stain too lightly. The presence of a nucleus in these cells obviated the necessity of using a counter-stain when it was found that methylene blue (Löffler's, in 0.85% NaCl) satisfactorily stains both nucleus and reticulum. The air-dried smears simply were suspended in a jar of this stain for three minutes or so, removed, washed briefly in running water, and again air-dried. With this relatively simple procedure, a very high proportion of excellent preparations resulted. These stains tended to fade when covered with oil for several hours. For the earlier experiments, the reported values for reticulocyte percentage are based upon

* Scientific Section, A. PH. A., Madison meeting, 1933.

[1] Valentine's Meat-Juice Company, Medical College of Virginia, Richmond.

average counts made by two individuals; later, by one and the same individual. In either case, at least 1000 cells were counted for each sample, and 2000–4000 cells when the distribution was irregular. Except early in the first few experiments, all but the most doubtful reticulated cells were counted as reticulocytes.

Blood for red counts and hemoglobin were collected from the same veins in the usual pipettes. The instruments (improved Neubauer, Sahli) were not specially standardized, but as the same set of each apparatus was used throughout, and by the same individuals, the figures reported for either determination are strictly comparable.

Preparations, Dosages, etc.—The lots of intramuscular liver extract used (excepting sample "X," 1 cc. = 33.3 Gm. liver) were of approximately the same liver equivalence (1 cc. = 5 Gm. of liver extracted). Phenol or tricresol 0.05% was used as preservative. Dosages were chosen to provide about 156 mg. of total solids, as determined before neutralization and sterilization. This required 0.70–0.75 cc. of extract in all. This amount, whether given in 1, 3 or 6 injections hereinafter is referred to as a "single dose," half the amount as a "half dose," etc. Organic solids, approximated by deducting ash from total solids, amounted to 147 mg. per cc. in one representative lot.

Saline 0.85% for injection contained phenol 0.05%.

The amino acid dosages were about equivalent to the organic solids contained in the single dose of liver extract. Histidine-HCl and tryptophane were about equal by weight in Experiment 9*b*, and 2:1 molecularly, respectively, in Experiments 5*a*, 10*b* and 11*c*.

Ash was dissolved in HCl, filtered, neutralized and made to double the volume of the extract ashed; ash obtained from the single dose of extract was given in each of the two tests.

Only the liver extracts were Berkfeld filtered; other solutions were heat treated excepting those of histidine-tryptophane designated later. Injections were intramuscular or subcutaneous into the breast excepting the 3 saline tests made on leg muscles.

All birds which gave negative responses after administration of inert substances were shown to be responsive to liver extract at some time or other.

RESULTS AND DISCUSSION.

Control Periods.—The reticulocyte percentages (hereinafter abbreviated to R. P.) for six of the first seven birds fell from 15–22 per cent down to 8–10 per cent (in one case, to 5 per cent), after about 25 days of confinement. Instead of leveling off at the minimum as expected, many of the curves climbed again before coming to a fairly constant level in the range 11–13 per cent. For brevity these parts of the curves, as well as most of the negative curves for other substances, are omitted from the figures and tables.

The first saline control experiment unfortunately was begun during the unexpected rise following the first minimum, and resulted in an apparent boost from 13% to 19%. The same bird later responded to a single dose of liver extract, one injection, by a rise from 13% to over 21%. Three other initial saline controls were entirely negative.

Effect of Liver Extract.—Liver extract injections produced significant reticulocyte responses in all instances. While the double dose (Experiment 1*a*, Table I) gave only slightly greater absolute rise in R. P. than did the average single dose (2*a*–11*a*), the latter averaged about twice as effective as the half doses (7*d*, 10*d*). The relative rises in R. P. vary much more than the absolute increases, since in general the greater responses occurred with the lower starting levels of R. P. Evaluation of the absolute rise in R. P. per unit of dosage per kilo of body weight should give better comparative figures ("Response Index"). The greatest variation of this index occurs between Experiments 6*b* and 4*c*—about 61 per cent, based on the lower value (2.3). It is felt that the variations between some of the other

experiments would have been less if only those birds weighing 300–400 Gm. had been used, since the smaller birds, as compared with the larger, usually did not seem to respond (to the same amount of extract) quite in inverse proportion to the body weights. Perhaps the single dose was above the optimum dose for these smaller pigeons. In Experiments 2*a*, 4*a* and 4*c*, delayed secondary peaks in the R. P. curves occurred. The higher points appear to be nearer the correct values, as compared with the average results. Apparently, the double rises are more likely to occur after multiple injections. In 4*c* (1 injection) the difference between the two peaks, both in time and in R. P., was much less than after 6 injections in 2*a* and 4*a*. Obviously, a considerable number of tests would have to be made to obtain a quantitative assay.

In a number of the earlier experiments, small hematomas formed around the wing veins, but probably caused no stimulation of hematopoiesis, since some of them accompanied the level or descending curves after salt or other inert sub-

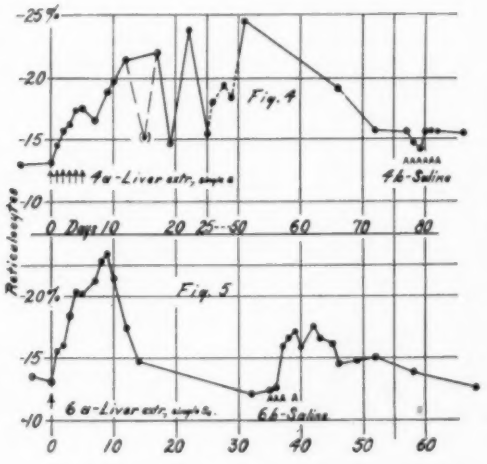


Fig. 4 and Fig 5.—Effect of intramuscular liver extract, followed by saline, on pigeon reticulocyte percentages.

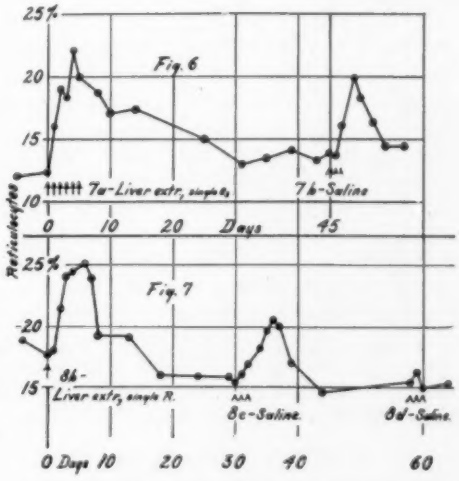


Fig. 6 and Fig. 7.—Effect of intramuscular liver extract, followed by saline, on pigeon reticulocyte percentages.

stances. Significant hemorrhage occurred in only one instance, a salt experiment to be discussed later. All birds treated with liver extracts appeared to be in good general health throughout the experiments.

Red cell and hemoglobin determinations were undertaken after the diet and the prolonged confinement appeared to produce blood paler in color, with increased erythrocyte size, while liver extract treatment seemed to deepen the color. The results (Table II and Fig. 8) indicate probable increases in hemoglobin and notably higher red cell counts after the single doses. It was necessary to dilute the third sample 1:1 in Experiment 4*c* in order to obtain a hemoglobin reading on the (Newcomer) instrument scale, but the values have been omitted because of probable error in readings for the first two samples. In Experiment 11*a* the r. b. c. increased one million even with a high starting level.

Except, possibly, for earlier response, the results agree qualitatively with those of Edmunds, Brueckner and Fritzell, but close comparisons are difficult

because of the differences in dosage and starting levels. As compared with the results of Vaughan *et al.*, for equivalent doses of similar extracts, the reticulocyte responses are of about the same order. Their findings that red cell counts were not appreciably influenced, very likely may be explained on the basis that their last samples were taken the day after the last injection, *i. e.*, the seventh day after the first injection. In Table II it appears that the maximum values for red cells are reached somewhat later, and that the increase at 7 days (Experiment 4*c*) may be slight. The fact that our doses were given in one injection, or in three at the most, that unknown hereditary or environmental factors may have operated, or that there may have been actual differences in the extracts used, must also be considered. That the extracts employed in the present work produced no weight increase beyond the normal fluctuation possibly indicates a difference in composition. Over *long* periods, the diet and inactivity maintained or increased the weight of all birds used.

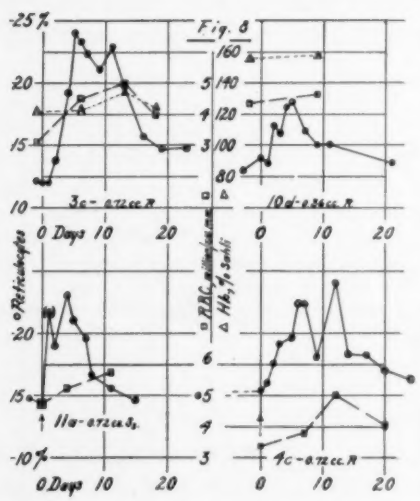


Fig. 8.—Effect of liver extract intramuscularly on reticulocytes, red blood cells and hemoglobin in pigeons.

Salt Injections after Liver.—When the R. P. of the first pigeon injected with liver extract had fallen to a level, at 15–16%, saline injections into the breast were begun. The day after the second injection, the R. P. had risen to 22.3%, when the bird was discarded. It was then decided to follow this effect in other birds. (Fig. 4 to 7; Fig. 1 to 3 have been omitted to save space.) Thus it was possible to show that, for the dosages used, the magnitude of the effect gradually and rather evenly decreased until it became negligible at 70–77 days after the last injection of liver. The only satisfactory explanation available was that the saline "flushed out" from the site of the injections a quantity of the liver substance which otherwise but gradually would become absorbed. In 2 later tests, brief massage of the injected areas on several different days produced no response, although distilled water gave a 2.5% rise in one. Injection of salt was then made in the leg muscles after liver in the breast, with a tremendous rise resulting. This bird, however, had bled heavily after blood sampling on the day before the first salt injection. A second such experiment, soon after a half dose of extract, brought a 3.8% increase, practically to the peak after liver, though from a higher starting level. Salt was then injected into the leg muscle of a pigeon which had received no previous liver treatment. No R. P. rise resulted. Previous liver administration apparently is necessary if the salt effect is to be elicited by injection either into the leg or the breast. These results render the explanation of the salt-after-liver effect still more obscure, since it scarcely is conceivable that the injection into the leg of as little as 0.72 cc. of physiological saline, divided into 2 or 3 doses, could directly cause liberation of any active principle stored at some remote site.

Ash of Liver Extract; Leucine.—Two experiments with each of these preparations showed no reticulocyte response.

Histidine and Tryptophane.—The first trial with the combined amino acids (9*b*), in which about 114 mg. were given in 4 injections, brought a prompt but transient R. P. rise of 6.8%. The peak was reached before the third injection and the curve had descended below the starting level two days after the last injection. This bird undoubtedly was sick, as shown by ruffled feathers and marked diarrhea during and for at least a month after the injection period, but whether the condition preceded the first injection was not noticed. In the next test (5*a*), 100 mg. produced

a 3.5% rise, lasting somewhat longer, and without pathological symptoms. This experiment was the only one of this series in which red cell and hemoglobin determinations were made (Table II). Although there was an apparent slight increase in hemoglobin, the red cell count continued to decrease. Each of these solutions had been made definitely alkaline to litmus by addition of NaOH before sterilization in the boiling water-bath, upon which, particularly in the first, a yellow discoloration resulted. Because of this, and in view of the known lability of tryptophane, it seemed possible that decomposition products might have been responsible for the observed effects. For the next experiment (10*b*), with 100 mg. of the combined acids, Na_2CO_3 was used for neutralization and the solution was not heated. The results were definitely negative, as also in a fourth trial (11*c*) in which were used 112 mg. from a new source of supply, neutralized with NaOH and heat treated. Two more experiments, respectively using histidine-HCl (78 mg.), and tryptophane (75 mg.) separately, made slightly alkaline with $NaHCO_3$ and heated, also gave no increase in R. P. although the tryptophane solution was fairly yellow in color.

The positive results in Experiment 9*b* may as reasonably be attributed to sickness of the bird as to injections of the amino acids, since in two instances subsequently, R. P. increases were found to accompany diarrhea when nothing had been injected. Whether to attribute the moderate R. P. response in 5*a* to histidine-tryptophane, to decomposition products thereof, or to unknown causes remains debatable. The existence of difference in degree of decomposition as compared with the subsequent negative experiments is a possibility. Whatever the rôle of tryptophane and histidine in pernicious anemia it seems justifiable to conclude that they, as free amino acids, are not the substances in liver extract effective in the pigeon. Although histidine was found present by qualitative test, only combined tryptophane was demonstrated, and it is extremely unlikely that more than a small fraction of the organic solids of the extracts is composed of these amino acids. The pigeon-active crystalline material isolated from liver extract, and used in Experiment 5*b* (Table II) gave negative tests for histidine, tryptophane and tyrosine. Further details are omitted since the crystals later were found to be impure and too little was available for a complete study.

Copper.—Although ash was ineffective, the fact that liver extract produced much more increase in erythrocyte count than in hemoglobin indicated that the possible effect of copper should be checked separately. Each of 3 birds was given 0.01 mg. Cu (0.1 cc. of $CuSO_4$) in single injections. This amount of copper was practically twice that found by analysis in the single dose of preparation T. Two of the birds showed no response; the third, an R. P. rise of 3.5 per cent, about equal to the result after a half dose of liver extract. Thus the presence of traces of copper appears to account for little more than a quarter, if any, of the response noted after liver extract injection.

Clinical Comparison.—Unfortunately, circumstances have prevented extensive clinical testing of the extracts used in the present work. Preparation "R" in four cases of tropical sprue exhibited low potency as compared with a well-known commercial product. Another sample failed to provide maintenance in a case of pernicious anemia, although equal volume dosages of commercial extract "X" proved adequate.[1] Since equal volumes of "R" and "X" produced about the same response in the pigeon, the assumption that the pigeon test is specific for the anti-pernicious anemia principle may be unjustified Also, Edmunds, *et al.* observed destruction of pigeon potency upon heating an extract at 75° for 15 minutes, yet clinically potent preparations often have been sterilized by heat treatment.

It should be noted that the dose necessary to give significant reticulocyte increase in the "normal" pigeon is tremendously large compared (on the basis of body weight) with the clinically therapeutic dose. Thus, 0.36 cc. of "X" in the

[1] We are indebted to Dr. Rafael Molina, University of Porto Rico, San Juan, P. R., and Dr. Wm. B. Porter, Medical College of Virginia, Richmond, for the reports on sprue and pernicious anemia, respectively.

400-Gm. pigeon (8*f*) is equivalent to 54 cc. in a 60-kilo patient. Yet the pigeon reticulocyte increase was only 3.6 per cent, 27 per cent over the starting level, and only about twice as great as a possible normal fluctuation.

General Recommendations for Performance of the Pigeon Test.—To attain more uniform results, certain recommendations seem warranted. Birds weighing 300–400 Gm. are preferable. Those which exhibit diarrhea should be discarded. To guard against spontaneous reticulocyte rises which occasionally occur, two or three blood samples had best be examined at close intervals before, and including the day of injection. The flow of blood should be stopped promptly after sampling (this usually offers no difficulty). The dosage for active extracts should be chosen to give an absolute increase in reticulocyte percentage of at least 8–12 per cent when the optimum initial level of 11–13 per cent is used. Single injections are preferred if the resultant volume is

TABLE I.—RETICULOCYTE RESPONSES IN GRAIN-FED PIGEONS AFTER LIVER EXTRACT INTRAMUSCULARLY.

Pigeon.	Experiment.	Total Dose, Cc.	No. Injs.	Ret. Span.	Ret. Abs.	Rise % Rel.	Wt. at Inj., Gm.	Response Index.[1]
1	1*a*	1.80Q	6	10.8–23.1	12.3	114	253	1.6–
2[3]	2*a*	0.72R	6	11.9–20.3	8.4	71	211	1.8–
				–25.1	13.2	111		or 2.8–
3	3*a*	0.75S_3	6	11.0–22.3	11.3	103	264	3.0
	3*c*	0.72R	3	12.0–24.0	12.0	100	(280)	(3.4–)
4	4*a*	0.90Q	6	13.2–22.0	8.8	67	229	2.0
				–24.5	11.3	86		or 2.6
	4*c*	0.72R	1	15.4–22.4	7.0	45	260	(1.8)
				–24.1	8.7	56	est.	(2.3–)
	4*d*	0.72T	2	14.0–25.2	11.2	80	245	2.7
6	6*b*	0.75S_3	1	13.1–23.4	10.3	79	360	3.7
7	7*a*	0.78S_3	6	12.3–22.0	9.7	79	323	3.1
8	8*b*	0.72R	1	17.7–25.0	7.3	41	(400)	(2.9)
11	11*a*	0.72S_3	1	14.4–23.1	8.7	60	(316)	(2.7)
7[4]	7*d*	0.36R′	1	12.3–17.2	4.9	40	336	3.3
10	10*d*	0.36R′	1	14.0–18.5	4.5	32	379	3.3
6	6*e*	0.36X[2]	1	12.3–15.9	3.6	29	396	2.9
8	8*f*	0.36X[2]	1	12.7–16.1	3.4	27	400	2.7

[1] Response index = $\frac{\text{Absolute rise in R. P.}}{\text{No. of "Single dosages" per Kg. of body weight}}$

[2] X = A commercial preparation.

[3] Experiments 2*a*–11*a*, "single doses." Bracketed figures indicate a second, delayed peak in reticulocyte curve. Parentheses indicate figures are subject to some error because of failure to weigh birds at time of injection.

[4] Experiments 7*d*–8*f*, "Half doses."

not too large, as this saves time and labor and probably gives smoother curves. Reticulocytes should be determined at one- to two-day intervals until after the maximum appears to have been passed. The same pigeon can be used for repeated tests if disappearance of the active substance is demonstrated by salt injection before each new experiment, or if the time between tests is known to be ample from previous experience.

CONCLUSIONS.

Inorganic constituents (liver extract ash, copper), leucine and likely histidine and tryptophane have been eliminated as constituents of liver extract effective in increasing the reticulocyte percentage in the blood of grain-fed pigeons. Liver extract injection also significantly increases the concentration of red blood cells

and probably the hemoglobin in such birds. While these results strengthen the assumption that the pigeon response is a measure of the substance or substances effective in pernicious anemia, limited clinical comparisons indicate that the pigeon

TABLE II.—RED CELL AND HEMOGLOBIN RESPONSES.

Experiment.	Dose.	Days after 1st Inj.	Retic. %.	Red Cells, Million Per Cu. Mm.	Hemoglobin, Sahli %
3*c*	Single R, in 3 injs.	0	12.1	3.12	122
		7	23.3[1]	4.54	123
		14	19.7	5.00	135
4*c*	Single R, 1 inj.	0	15.4	3.40	
		7	22.4	3.81	Unchanged (?)
		12	24.1[2]	5.02	Increased[3]
		20	17.0	4.08	
5*a*	Histidine, tryptophane, 100 mg. in 2 injs.	−3	15.8	3.84	83
		−1	15.6	3.74	
		1	16.0		
		3	16.8	3.14	
		7	19.3[4]	3.39	90
		13	15.0	3.36 (10/31/32)	
5*b*	Crystals (L. E.) 44 mg. 3 injs.	0	14.8		
		9	19.2[5]	4.91 (1/4/33)	
10*d*	Half R, 1 inj.	−2		4.37	156
		0	14.0[6]		
		9	15.1	4.63	158
11*a*	Single S_3, 1 inj.	0	14.4	4.77	
		4	23.1[7]	5.23	
		11	15.6	5.77	

Remarks: [1] Max., 24.0%, 6th day. [2] Max. [3] Figures (Newcomer) omitted because of error in reading. [4] Max.; R. P. rise not typical (?). See discussion. [5] Max., 22.5%, 5th day. [6] Max., 18.5%, 5th day. [7] Max.

effectiveness may not parallel the clinical response. Further clinical comparison is necessary to settle the question of specificity or practical utility.

REFERENCES.

(1) Janet M. Vaughan, G. L. Muller and L. Zetzel, *Brit. J. Exptl. Path.*, 11 (1930), 456.
(2) C. W. Edmunds and H. H. Brueckner, *J. Pharmacol.*, 45 (1932), 258.
(3) C. W. Edmunds, H. H. Brueckner and Agnes I. Fritzell, JOUR. A. PH. A., 22 (1933), 91.
(4) G. Fontes and L. Thivolle, *Compt. rend. soc. biol.*, 106 (1931), 219.

A METHOD FOR THE DETERMINATION OF MINUTE AMOUNTS OF ALDEHYDES IN ETHER.*

BY M. W. CAREY, L. W. GREEN AND R. E. SCHOETZOW.

Several investigators (1, 2) have shown that the U. S. P. X test, for aldehydes in ether, is not sensitive to small amounts. The use of solid potassium hydroxide instead of the solution which is directed by the U. S. P. X, will increase the sensitivity so that between 50 and 100 parts per million of acetaldehyde may be detected

* Scientific Section, A. PH. A., Toronto meeting, 1932.

We desired a method capable of detecting as well as estimating much smaller quantities of aldehydes than those detectable by the U. S. P. X and similar tests.

A search of literature seemed to show that the most sensitive tests for aldehydes in ether are those employing fuchsine sulphurous acid, alkaline silver nitrate and Nessler's reagent.

The silver reduction test is performed with reagents composed of silver nitrate, sodium hydroxide and ammonia. The disadvantages are that reducing substances in general will react with ammoniacal silver nitrate and also if care is not exercised to immediately destroy the test materials, accidents may result, because the materials may explode upon standing. The test appears to be sensitive to one part per million, but, since it is not specific for aldehydes, we discarded it from consideration.

Nessler's reagent, likewise, although equally sensitive is not specific for aldehydes. The other impurities, which may be present in ether, such as peroxide will affect the test. Even alcohol, a substance which is normally present in anesthetic ether, reacts with Nessler's reagent within a few minutes. For these reasons, we discarded it, notwithstanding its official recognition in some foreign pharmacopœias.

The fuchsine sulphurous acid reagent has been used by Phelps and Rowe (3) in a quantitative manner with a sensitivity of about 30 parts per million.

Articles by Leffman and Pines (4) and Leffman and Trumper (5) showed that a fuchsine sulphurous acid reagent formulated by Fincke was extremely sensitive to aldehydes in ether; so sensitive in fact that they stated that it might be necessary to fix a toleration limit for practical control. We studied the use of this reagent and found it very sensitive. Although we found by experiment conditions under which it could be used in a quantitative manner capable of estimating aldehydes within two or three parts per million, yet it was not entirely satisfactory, because we had to run the test at a low temperature. Even at that temperature, some slight oxidation of the reagent seemed to occur, which gave rise to questionable readings at times.

Middleton and Hyman (6) published an excellent review of the various tests for aldehyde in ether. In this article, they stated that in testing ether, the use of Schiff's reagent (7), which is a fuchsine sulphurous acid reagent, had been limited by uncertainty as to its significance owing to the color showing a progressive increase in time, but that this objection could be removed by the addition of 0.1% pyrogallol, which does not decrease sensitivity, but does restrain oxidation.

Recently we substituted the decolorized fuchsine solution of the British Pharmacopœia, 1914 edition, with the addition of 0.1% of pyrogallol for the Fincke reagent which we had been using for some time and found that a definitely negative test could always be obtained with ether specially treated so as to be aldehyde-free. At the same time this reagent is sensitive enough to disclose aldehydes when added to the same ether in the proportion of one part per million. The test has the advantage that it may be run at room temperature while previously we had been obliged to use a lower and accurately controlled temperature.

The desirable features of this method are as follows:

1. It is sensitive to less than one part per million of aldehyde in the hands of the average operator and can be used to estimate somewhat larger quantities of

aldehydes with an accuracy of plus or minus two parts per million and perhaps plus or minus five parts per million for quantities up to about 50 parts per million.

2. The reaction is specific for aldehydes while compounds other than aldehydes likely to be present in ether give negative results. The compounds tried included peroxides, acetone and alcohol.

3. Results obtained were readily checked.

The details for carrying out the test are as follows:

PREPARATION OF FUCHSINE SULPHUROUS ACID TEST SOLUTION.

Prepare decolorized fuchsine solution according to the formula given in the 1914 edition of the British Pharmacopœia, which is as follows:

"Dissolve one gram of Fuchsin in five hundred millilitres of hot Distilled Water; add slowly twenty millilitres of a saturated aqueous solution of Acid Sodium Sulphite, and then, also slowly ten millilitres of Hydrochloric Acid, the mixture being kept well shaken. Cool and add sufficient Distilled Water to produce one thousand millilitres." To this add 0.1% of pyrogallol.

NOTES: 1. Basic fuchsine dyes of different brands vary in sensitivity.

2. Certain samples of fuchsine cannot be entirely bleached with sulphurous acid. We have found the resultant amber-colored solutions less sensitive than the colorless ones, which may be prepared from better brands of fuchsine.

3. Fuchsine sulphurous acid solution should be kept in a refrigerator to prevent decomposition.

PREPARATION OF ALDEHYDE-FREE ETHER.

Shake continuously equal parts of ether and sodium bisulphite solution (30%) for one hour. Separate and discard the sodium bisulphite solution. Then add to the ether, one-fifth of its volume of sodium hydroxide solution (10%) and shake for ten minutes. Separate and discard the sodium hydroxide solution. Test the ether according to the method given below. A colored line or band must not be produced.

PREPARATION OF ALDEHYDE STANDARDS.

(*a*) Prepare aldehyde-free alcohol and the primary standard acetaldehyde solution therefrom containing 1 Gm. acetaldehyde per 100 cc., according to the Methods of Analysis of the A. O. A. C. (8).

(*b*) Accurately measure 1 cc. of the standard aldehyde solution prepared under (*a*) and dilute to 100 cc. with aldehyde-free ether. Mix thoroughly. This solution contains 100 p. p. m. of acetaldehyde. Dilute this solution further with aldehyde-free ether to prepare dilutions containing 50, 30, 10 and 5 p. p. m. of acetaldehyde. After a preliminary test using these standards, other standards can be prepared to match the sample under examination.

NOTE: The primary standard acetaldehyde solution as prepared under (*a*) and the secondary or dilute standards as prepared under (*b*) should be kept in a refrigerator. The former will retain its strength for at least two weeks. The others must be prepared freshly.

THE QUANTITATIVE ALDEHYDE DETERMINATION.

Place 5 cc. of the ether under examination, 5 cc. of each of the appropriate standards, including one containing aldehyde-free ether as a blank, into separate

8″ x 1″ test-tubes preferably arranged in a rack under good light and provided with a white background. Then add slowly to each tube a 5-cc. portion of decolorized fuchsine test solution, holding the tip of the pipette just over the surface of the ether so as to float the ether quietly over the test solution. Do not shake or disturb the tubes. At the end of twenty minutes, observe the color at the junction of the two layers. The aldehyde content of the ether under examination is the same as that of the standard which it matches.

If necessary, repeat the comparison with stronger or weaker standards.

NOTES: 1. A match or nearly a match must result before making a decision as to the aldehyde content of the ether. This is necessary, since the color is not directly proportional to the aldehyde content. For instance, the ether containing 50 p. p. m. of aldehyde will not give twice as heavy a red band as one containing 25 p. p. m.

2. Do not shake the tubes nor disturb them until the time of examination; it causes the faint-colored bands produced by minute amounts of aldehyde to be dissipated throughout the aqueous layer and, practically, to disappear.

The substitution of the British Reagent plus pyrogallol for the Fincke's Reagent has occurred so recently that we have not had so much experience as desired, but we believe it the most satisfactory of all we have worked with and will continue our work with it.

REFERENCES.

(1) E. Mallinckrodt, Jr., *J. A. C. S.*, 49 (1927), 2655.
(2) F. Van Deripe, L. W. Green and R. E. Schoetzow, JOUR. A. PH. A., 18 (1929), 1228.
(3) E. P. Phelps and A. W. Rowe, *J. A. C. S.*, 48 (1926), 1049.
(4) H. Leffman and C. C. Pines, *Am. J. Pharm.*, 102 (1930), 58.
(5) H. Leffman and M. Trumper, *Ibid.*, 99 (1927), 290.
(6) G. Middleton and F. C. Hyman, *Analyst*, 56 (1931), 238.
(7) H. Schiff, *Ann.*, 140 (1866), 132.
(8) Methods of Analysis, *A. O. A. C.*, 3rd Edition, page 144.

NOTE: This paper was read at the Toronto meeting of the A. PH. A. in 1932. Since that time, we have found it advisable to standardize the temperature at 20° C. at which to perform the test. We have also found it advisable to use redistilled acetaldehyde and aldehyde-free ether in the preparation of the aldehyde standards instead of the methods mentioned above.

ANALYTICAL LABORATORIES,
CHEMICAL & PHARMACEUTICAL DIVISION,
E. R. SQUIBB & SONS.

A. Ph. A. Resolution No. 10. Thanks to Council on Medical Education and Hospitals of American Medical Association.

Resolved, that the thanks of the AMERICAN PHARMACEUTICAL ASSOCIATION be expressed to the Council on Medical Education and Hospitals of the American Medical Association for the favorable attitude expressed by resolution of this body on the subject of hospital pharmacies and their supervision and be it further

Resolved, that the AMERICAN PHARMACEUTICAL ASSOCIATION continue its endeavors to provide for the supervision of all pharmaceutical work in hospitals by registered pharmacists.

QUALITATIVE TESTS FOR EPHEDRINE AND ITS DERIVATIVES*,[1]

BY C. T. FENG AND B. E. READ.

In the course of our research upon the best quantitative method of assay for ephedra and its alkaloids we undertook a large number of qualitative tests with a view of possibly finding one which would prove of worth in quantitative work. While this has not been definitely attained much useful information has been brought together concerning the reaction of ephedrine and its derivatives toward various laboratory reagents which we herewith report.

Chen in 1925 (1) in one of his first reports from these laboratories gave a list of reactions of ephedrine with several of the commoner laboratory reagents, and later Chen and Kao (1926) (2) summarized the various tests known q. v., which it is unnecessary for us to go over again now.

Tsiang and Brown (1927) (7) gave a more complete report upon the gold and platinum salts made with solutions of ephedrine varying in strength from 1 in 10,000 to 1 in 1000. With Krant's reagent they obtained a characteristic crystalline precipitate.

On account of the fact that Chinese ephedra has been shown to contain (*a*) ephedrine, (*b*) pseudoephedrine (6), and (*c*) methyl-ephedrine (5), we have carefully extended our tests to all three of these compounds; also to the (*d*) butyl, (*e*) benzyl and (*f*) quaternary halide compounds which have been synthesized in these laboratories (4).

Unless indicated otherwise, solutions of the above compounds were found to give their best reactions in the following concentrations: (*a*) and (*b*) five to ten per cent, (*c*) two and a half to five per cent, (*d*) and (*e*) one to two and a half per cent, and (*f*) one-tenth to one per cent.

1. BIURET TEST (MODIFIED) (3).

(*a*) *Ephedrine Hydrochloride.*—A violet pigment very soluble in ether giving a brilliant solution, which when evaporated to dryness yields a gelatinous residue (3).

(*b*) *Pseudoephedrine Hydrochloride.*—The pigment is more slowly soluble in ether yielding a solution of dull appearance, which when air dried produces beautiful violet crystals (3).

(*c*) *Methyl-Ephedrine Hydrochloride.*—Vigorous shaking of the reaction mixture showed that the pigment was not extractable by ether, but before shaking the ether dissolved some of the pigment.

(*d*) *Butyl-Ephedrine Hydrochloride.*—Identical with (*c*).

(*e*) *Benzyl-Ephedrine Hydrochloride.*—The pigment was absolutely insoluble and was not extractable by ether.

(*f*) *Quaternary Halide.*—No biuret coloration produced.

2. POTASSIUM IODIDE TEST. A SATURATED SOLUTION ADDED TO A FIVE PER CENT SOLUTION OF EACH COMPOUND.

(*a*) Prisms or rhombic bars. (Fig. 1.)

(*b*) Hexagonal rhomboid plates. (Fig. 2.)

(*c*) Slowly producing thin flaky crystals. (Fig. 3.)

(*d*) Producing oily drops immediately, from which rosettes separate later. (Fig. 4.)

* The cost of these experiments was defrayed partly by a grant from the Council on Pharmacy and Chemistry of the American Medical Association.

[1] From the Department of Pharmacology, Peiping Union Medical College, Peiping, China.

Fig. 1.

Fig. 2.

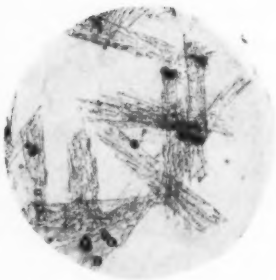


Fig. 3.

Fig. 4.

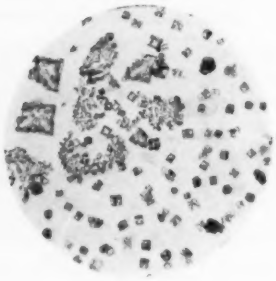


Fig. 5.

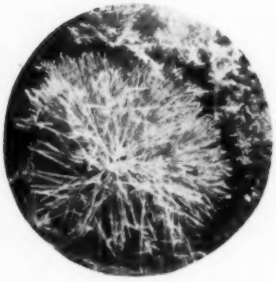


Fig. 6.

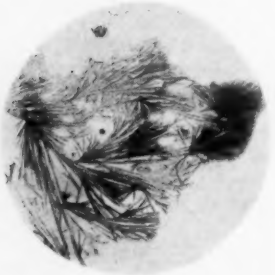


Fig. 7.

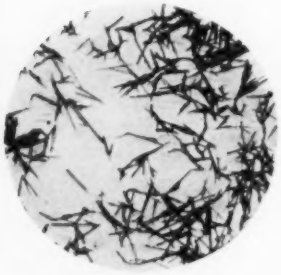


Fig. 8.

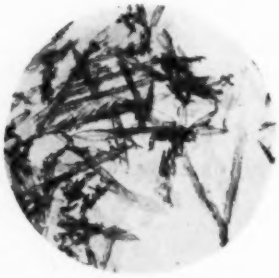


Fig. 9.

Fig. 10.

Fig. 11.

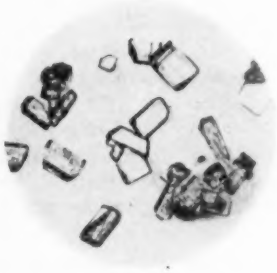


Fig. 12.

Fig. 1.—Potassium iodide and ephedrine hydrochloride. Fig. 2.—Potassium iodide and pseudoephedrine hydrochloride. Fig. 3.—Potassium iodide and methyl-ephedrine hydrochloride.

Fig. 4.—Potassium iodide and butyl-ephedrine hydrochloride. Fig. 5.—Cadmium potassium iodide and ephedrine. Fig. 6.—Cadmium potassium iodide and methyl ephedrine.

Fig. 7.—Picric acid and ephedrine. Fig. 8.—Picric acid and pseudoephedrine. Fig. 9.—Picric acid and methyl ephedrine.

Fig. 10.—Ammonium thiocyanate and ephedrine. Fig. 11.—Ammonium thiocyanate and pseudoephedrine. Fig. 12.—Ammonium thiocyanate and methyl ephedrine.

(*e*) Oily droplets which do not crystallize in one or two hours.
(*f*) Readily producing clusters of characteristic rhombic crystals (4).

3. AURIC CHLORIDE. THREE PER CENT, MICRO-TEST (7).

(*a*) Golden-yellow sharp needles, soluble in water and alcohol.
(*b*) Golden-yellow feathery needles, soluble in water and alcohol.
(*c*) Yellow prisms, soluble in water and alcohol.
(*d*) Yellow oily drops, slightly soluble in water, readily in alcohol.
(*e*) Similar to (*d*).
(*f*) Characteristic crystals.

The butyl-ephedrine mixture (*d*) evaporated to dryness yields a gelatinous mass which in several days crystallizes out, benzyl-ephedrine yields no crystals.

4. PLATINIC CHLORIDE. TWO PER CENT, MICRO-TEST (7).

(*a*) Pale yellow silky needles, very soluble in water or alcohol.
(*b*) Pale yellow bunches of long needles, very soluble in water or alcohol.
(*c*) Characteristic yellow needles, soluble in water or alcohol.
(*d*) Pale yellow rhombic-hemihedral crystals. Slightly soluble in water and very soluble in alcohol. A quicker reaction than that with auric chloride.
(*e*) Pale yellow drops. Slightly soluble in water, very soluble in alcohol.
(*f*) Characteristic fine needles (already published, Feng 1932 (4)).

5. CADMIUM POTASSIUM IODIDE. TWENTY PER CENT.

(*a*) Oily droplets separate which on standing crystallize out. (Fig. 5.) Readily soluble in water.
(*b*) Similar to (*a*).
(*c*) On standing clusters of characteristic needles are formed. Soluble in water. (Fig. 6.)
(*d*) Oily droplets first appear, which later crystallize out in irregular forms. Slightly soluble in water.
(*e*) Similar to (*d*).
(*f*) Fine flakes readily separate out which are almost insoluble in water.

All of the above crystalline precipitates are soluble in alcohol or acetic acid.

6. PICRIC ACID. ONE PER CENT, MICROCHEMICAL TEST.

(*a*) Yellow needle-shaped crystals, readily soluble in water. Shaped like pine needles. (Fig. 7.)
(*b*) Yellow needle-shaped crystals, soluble in water. Less fine than (*a*), shaped like thorns. (Fig. 8.)
(*c*) Yellow feathery leaflets, soluble in water. (Fig. 9.)
(*d*) Yellowish flakes, slightly soluble in water.
(*e*) Yellowish globules, slightly soluble in water.
(*f*) Characteristic yellowish needles, very soluble in water.

These results are sufficiently characteristic to be used to distinguish these six compounds one from the other. It is important to use the strengths of solutions given at the beginning of this report, earlier workers using weaker solutions reported negative results (1); ephedrine in strong solution certainly yields a crystalline precipitate with picric acid one per cent.

7. AMMONIUM THIOCYANATE. SATURATED SOLUTION. MICROCHEMICAL TEST.

(*a*) (Ephedrine in ten per cent solution.) Elongated prisms. (Fig. 10.)
(*b*) (Saturated solution of pseudoephedrine hydrochloride.) It sets to a glassy paste not showing discrete crystals. (Fig. 11.)
(*c*) (Five to ten per cent.) Rhombic hemihedral plates. (Fig. 12.)
(*d*) (Two and a half to five per cent.) Leaflets crystallize out on standing from the oily droplets which first separate out.
(*e*) (Two and a half to five per cent.) Oily droplets, which do not crystallize, separate out.

(*f*) (One to two and a half per cent.) Prismatic hemihedral plates. All of the above were readily soluble on the addition of water.

8. PHOSPHOMOLYBDIC ACID. TEN PER CENT.

All of the compounds with this reagent yielded a pale yellow precipitate, which became blue on standing for a definite length of time varying, with the compound tested:

(*f*)	Methyl-ephedrine-methyl-iodide	In 1 to 2 days
(*d*)	Butyl-ephedrine hydrochloride	In 2 to 3 days
(*e*)	Benzyl-ephedrine hydrochloride	In 3 to 4 days
(*a*)	Ephedrine hydrochloride (2)	In 4 to 6 days
(*b*)	Pseudoephedrine hydrochloride	In 6 to 20 days
(*c*)	Methylephedrine hydrochloride	In 6 to 20 days.

9. POTASSIO-MERCURIC IODIDE. MAYER'S REAGENT.

The compounds all yielded a whitish precipitate, the solubility in water or dilute acids varying with the compound used.

(*a*) and (*b*) Readily soluble.
(*c*) Soluble.
(*d*) and (*e*) Not very soluble.
(*f*) Almost insoluble.

10. POTASSIUM TRI-IODIDE. WAGNER'S REAGENT.

A strong solution of iodine five per cent and potassium iodide five per cent gave brown precipitates with all the compounds. The reagent diluted 0.2 per cent, gave no permanent precipitate with ephedrine in one per cent solution and only a cloudy effect with pseudoephedrine one per cent. Butyl and benzyl-ephedrine in dilute solution of 0.1 per cent gave heavy precipitates.

11. POTASSIUM BISMUTH IODIDE. KRANT'S OR THRESH'S REAGENT.

A reddish precipitate insoluble in water is produced by all the compounds but on the addition of acetic acid (*a*), (*b*) and (*c*) were readily soluble, (*d*) and (*e*) were difficultly soluble and (*f*) was almost insoluble. (Tsiang and Brown (7) used this test with ephedrine 1 in 1000 solution.)

12. MERCURIC CHLORIDE. FIVE PER CENT.

No precipitate was obtained from (*a*), (*b*) or (*c*) in five per cent solutions, (*d*), (*e*) and (*f*) yielded white precipitates soluble in excess of the reagent,,or on the addition of water and weak acids.

13. SODIUM NITROPRUSSIDE. FIVE PER CENT.

Only butyl-ephedrine and benzyl-ephedrine in five per cent solution formed flesh-white precipitates, soluble in excess of water.

14. BISMUTH NITRATE. FIVE PER CENT, SLIGHTLY ACIDIFIED WITH NITRIC ACID.

They all yield white precipitates soluble in excess of nitric acid. This test is more sensitive than some, especially with the quaternary halides (*f*), each of which give a characteristic result described in another report (4). One of these quaternary compounds might be used to estimate bismuth.

15. AMMONIUM MOLYBDATE. FIVE PER CENT.

All the compounds form white precipitates soluble in excess of the reagent or on the addition of water, the solubilities decreasing in the order cited, as was the case in other tests.

16. PHOSPHOTUNGSTIC ACID. TEN PER CENT.

White curdy precipitates of nonspecific character were produced by all the compounds.

17. ZINC-CHLOR-IODIDE. STEPHENSON'S REAGENT.

There was obtained in all cases a brownish white precipitate insoluble on the addition of water, but soluble in dilute acetic acid.

18. REAGENTS WITH NO VISIBLE REACTION.

Tannic acid, barium nitrate, cobalt chloride, glucose, glycerine, manganese chloride, nickel chloride, phthalic acid, potassium ferri and ferrocyanides, sodium benzoate or nitrite. The reactions with potassium permanganate and chromic acid were so unstable that they seem worthless as test reagents for this class of compound.

NOTE.

Many of the above tests confirm earlier reports upon the various reactions of ephedrine, but this is the only comprehensive statement dealing with solutions of known strengths.

LITERATURE CITED.

(1) K. K. Chen, JOUR. A. PH. A., 14 (1925), 189–194.
(2) K. K. Chen and C. H. Kao, *Ibid.*, 15 (1926), 625–639.
(3) C. T. Feng, *Chinese J. Physiol.*, 1 (1927), 397–406.
(4) C. T. Feng, JOUR. A. PH. A., 21 (1932), 8–15.
(5) C. T. Feng and B. E. Read, *Chinese J. Physiol.*, 2 (1928), 87–96.
(6) B. E. Read and C. T. Feng, *Ibid.*, 1 (1927), 297–304.
(7) K. Tsiang and E. D. Brown, JOUR. A. PH. A., 16 (1927), 294–296.

A NOTE ON THE WATER CONTENT OF MAGNESIUM OXIDE.*,[1]

BY JACOB E. SCHMIDT AND JOHN C. KRANTZ, JR.

INTRODUCTION.

The Pharmacopœia recognizes dual standards for magnesium oxide and heavy magnesium oxide. The rubric requires 96 per cent purity after ignition and permits 10 per cent water to be present in the compounds in general use. In the preparation of the monographs for these compounds for the forthcoming edition of the Pharmacopœia, the authors had occasion to examine several commercial samples of each variety of magnesium oxide. The percentage of water found in the specimens showed great variation. In many instances the water content of the light variety exceeded the Pharmacopœial limit. The highest quantity of water found was 22 per cent.

On account of these findings, the authors investigated the problem and recorded their observations in this communication.

TABLE I.—PERCENTAGE OF WATER IN COMMERCIAL SAMPLES OF MAGNESIUM OXIDE.

No.	Light. Per Cent Water.	Heavy. Per Cent Water.	No.	Light. Per Cent Water.
1	22.0	7.8	8	11.5
2	20.3	7.8	9	18.0
3	20.3	7.8	10	21.9
4	19.2	3.4	11	19.3
5	19.4	6.5	12	22.5
6	14.0		13	14.5
7	17.9		Mean 18.5 per cent	

* Scientific Section, A. PH. A., Madison meeting, 1933.

[1] The expense of this investigation was defrayed in part by a grant from the Research Fund of the AMERICAN PHARMACEUTICAL ASSOCIATION.

EXPERIMENTAL.

Three commercial samples of each variety of magnesium oxide were ignited to a constant weight and the absorption of water from the atmosphere was studied. The samples were stored at room temperature in crucibles with liberal access to air. The specimens were not mixed at the various intervals when the increase in weight was determined.

These data are recorded in Table II.

TABLE II.

Time in Days.	Light Variety. Percentage Moisture. I.	II.	III.	Time in Days.	Heavy Variety. Percentage Moisture. I.	II.	III.	Relative Humidity.
1	6.93	5.65	7.15	1	2.93	1.30	1.54	43
2	9.90	8.65	10.05	2	4.63	1.85	2.30	44
3	12.12	10.68	11.82	3	6.16	2.22	2.70	68
4	13.50	12.44	13.21	4	7.34	2.32	2.85	68
5	14.31	13.42	14.20	5	7.85	2.39	2.85	72
7	14.49	13.70	14.38	7	8.11	2.42	2.94	52
8	14.70	13.88	14.52	8	8.42	2.52	3.10	48
9	14.98	14.28	14.85	10	8.82	2.42	3.18	67
11	15.04	14.39	14.92	13	9.15	2.57	3.35	54
13	15.41	14.71	15.25	21	10.01	2.68	3.38	61
21	16.20	15.46	16.08	28	10.20	2.70	3.44	50
28	16.40	15.62	16.25	37	10.42			58
37	16.70	15.80	16.41					

DISCUSSION AND CONCLUSIONS.

The foregoing results indicate, that when stored under the usual commercial conditions, the light variety of magnesium oxide contains considerably more than 10 per cent of water: average 18.5 per cent. The ratio $MgO:H_2O$ in the compound becomes quite stable at approximately 2:1.

The heavy variety of magnesium oxide as found commercially generally falls within the limit of the U. S. P. moisture requirement.

BUREAU OF CHEMISTRY,
STATE OF MARYLAND DEPARTMENT OF HEALTH.

COÖPERATION BETWEEN PHYSICIANS AND PHARMACISTS OF THE NORTHWEST.

BY GEORGE BENDER.—SYMPOSIUM ON "PRACTICING PROFESSIONAL PHARMACY."

"Some day I think some one should write a thesis on the leavening power of a cup of coffee. I think that would have more effect than anything else in bringing the physicians, pharmacists and dentists of the Northwest, particularly of the Twin Cities area, together.

"About three years ago the doctors and druggists of Minneapolis, by mutual consent, decided it was time to get together and talk things over. Individual problems and individual misunderstandings had arisen from time to time, and no solution seemed possible. By common consent, a committee was appointed from the medical association, from the pharmaceutical association and from the dental association to get together and talk things over.

"From this humble beginning, what is now known as the Inter-Professional Relationship Committee has developed, and efficient committees are functioning in each of the Northwest states. These committees have done some rather remarkable things." (We hope to have the paper for a later issue of the JOURNAL.)

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A. G. DuMez, Reporter on the Progress of Pharmacy.

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A. G. DuMez, University of Maryland, School of Pharmacy, N. W. cor. Lombard and Greene Sts., Baltimore, Maryland.

APPARATUS AND MANIPULATIONS.

Kroll, Fritz
A new machine for filling ampuls
Pharm. Ztg., 78 (1933), 1108

PHARMACOPŒIAS AND FORMULARIES.

Albertus, Halvar
Review of the Swiss (Cont.) Pharmacopœia V
Pharm. Revy, 32 (1933), 641, 653, 665
Breugelmans, J. G.
Some critical observations on certain analytical methods of the Belgian Pharmacopœia IV
J. pharm. Belg., 15 (1933), 733, 749, 765
Casparis, P.
Review of the Swiss Pharmacopœia V
Schweiz. Apoth.-Ztg., 71 (1933), 377, 594, 626
Hampshire, C. H.
Review of the new Swiss Pharmacopœia
Pharm. J., 131 (1933), 511
Rosenthaler, L.
Review of the Swiss Pharmacopœia V
Pharm. Zentralh., 74 (1933), 670, 701

PHARMACEUTICAL PREPARATIONS.

Babitsch, S.
Lead plaster
Arch. Pharm., 271 (1933), 446
Bateson, F. R. C.
Solutions of arsenious and mercuric iodides
Quart. J. Pharm. & Pharmacol., 6 (1933), 517
Brown, H. Treves
Mistura Bismuthi Hydroxidi
Quart. J. Pharm. & Pharmacol., 6 (1933), 502
Brown, H. Treves
Some proposed new formulæ for the British Pharmaceutical Codex
Quart. J. Pharm. & Pharmacol., 6 (1933), 506
Caines, Charles H., and Evers, Normal
Loss of color of compound tincture of cardamom in certain mixtures
Quart. J. Pharm. & Pharmacol., 6 (1933), 486
Feriz, H.
Use of iodoform gauze in surgery
Pharm. Weekbl., 70 (1933), 1158
Jensen, Wilh., and Orner, Holger
Comparison of values of different substances as preservatives for medicinal preparations
Dansk Tids. Farm., 7 (1933), 205
Morrison, S. W.
Amaranth as a substitute for cudbear with improved methods for the preparation of some N. F. galenicals
JOUR. A. PH. A., 22 (1933), 1112
Rowe, L. W., and Scoville, Wilbur L.
Tincture of digitalis
JOUR. A. PH. A., 22 (1933), 1087
Smelt, E. M.
Keeping properties of Liquor Arsenicalis
Quart. J. Pharm. & Pharmacol., 6 (1933), 375
Smelt, E. M.
Keeping properties of Liquid Extract of Ergot
Quart. J. Pharm. & Pharmacol., 6 (1933), 399
Woodard, W. A., and Cowland, A. N.
Stability of aqueous solutions of gallotannic acid
Quart. J. Pharm. & Pharmacol., 6 (1933), 363

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS.

Blicke, F. F., and Stockhaus, R. P. G.
Germicidal action of 2-chloro-4-*n*-alkylphenols
JOUR. A. PH. A., 22 (1933), 1090
Coward, K. H., *et al.*
Determination of vitamin A
Biochem. J., 27 (1933), 873; through *Pharm. J.*, 131 (1933), 541
Foshay, Lee
Antiserum for the treatment of tularemia
J. A. M. A., 101 (1933), 1447
Gage, J. C.
Variation in the susceptibility of mice to certain anesthetics
Quart. J. Pharm. & Pharmacol., 6 (1933), 418
Horner, Clyde E., *et al.*
Reports of cases of dermatitis, conjunctivitis and corneal ulceration following use of eye lash dye
J. A. M. A., 101 (1933), 1558–1560

Helms, Samuel T.
Some facts concerning the pharmacological action of acetanilid
Jour. A. Ph. A., 22 (1933), 1093
Lozinski, E., *et al.*
Relative activity of ergotoxine and ergotamine with special reference to the assay of ergot preparations
Quart. J. Pharm. & Pharmacol., 6 (1933), 395
Myers, G. N.
New morphine substitutes
Brit. Med. J., No. 3788 (1933), 282
Offerhaus, C., and Baert, C. G.
Anesthetics, particularly cocaine and novocaine (Cont.)
Pharm. Weekbl., 70 (1933), 1125, 1193
Tainter, M. L., *et al.*
Use of dinitrophenol in obesity and related conditions
J. A. M. A., 101 (1933), 1472
Tamamushi, Y.
Synthesis of homologues of histamine and their pharmacological action
J. Pharm. Soc. Japan, No. 620 (1933), 226
Wokes, Frank
Effect of calcium administration on the toxicity of carbon tetrachloride in mice
Quart. J. Pharm. & Pharmacol., 6 (1933), 413

BOTANY AND PHARMACOGNOSY.

Bondeson, Wolmar
Euphorbia piluliferæ herb (Cont.)
Farm. Revy, 32 (1933), 621
de A. Costa, O.
Pharmacologic study of manaca (Brunfelsia hopeana)
Bol. assoc. brasil. pharm., 14 (1933), 295; through *Chem. Abstr.*, 27 (1933), 5889
Dewar, T.
Histology of the leaves of Digitalis Thapsi
Quart. J. Pharm. & Pharmacol., 6 (1933), 443
Freudweiler, R.
Detection of the falsification of drugs and their microscopic examination with ultraviolet light
Pharm. Acta Helv., 8 (1933), 190
Lewis, S. Judd, and Wombwell, J.
Spectroscopic investigation of gum acacia
Quart. J. Pharm. & Pharmacol., 6 (1933), 475
Liberalli, C. H.
Chemistry of Mikania hirsutissima, D. C.
Rev. soc. brasil. Quim., 4 (1933), 5; through *J. Soc. Chem. Ind. Suppl.*, 52 (1933), 891
Rae, John
Comparison of the action of various solvents on defatted cochineal
Quart. J. Pharm. & Pharmacol., 6 (1933), 483
Smelt, E. M.
Chemical tests for strophanthus
Quart. J. Pharm. & Pharmacol., 6 (1933), 467
Valier, P.
Chemical composition of Retama spharocarps Boiss
Bull. sci. pharmacol., 40 (1933), 520
van Giffen, H. J.
Investigation of thyroid glands
Pharm. Weekbl., 70 (1933), 1101
Wallis, T. E., and Dewar, T.
Comparative study of the anatomy of buchu leaves and other species of Barosma
Quart. J. Pharm. & Pharmacol., 6 (1933), 347
Wasicky, R., and Oeriu, S.
Bark of Ailanthus glandulosa and the bitter principle ailanthin
Pharm. Presse, Wiss. Heft., 38 (1933), 120

ALKALOIDS AND GLUCOSIDES.

Grimme, Clemens
Determination of arbutin in uva ursi leaves and their preparations
Pharm. Zentralh., 74 (1933), 669
Haugen
Quantitative determination of alkaloids in ointments
Norsk farm. Tidsskr. (1932), 115; through *Pharm. Zentralh.*, 74 (1933), 721
Harold, M.
Preparation and purification of the alkaloids of ergot
Chim. et Ind., 29 (1933), Spec. No. 1017; through *J. Soc. Chem. Ind. Suppl.*, 52 (1933), 938.
Klimek, Romuald
New reaction for the differentiation of theophylline from theobromine and caffeine
Wiadomosci Farm., 60 (1933), 393; through *Chem. Abstr.*, 27 (1933), 5895
Mascre, M., and Caron, M.
Chemical and physiological assays of some lobelias
Bull. sci. pharmacol., 40 (1933), 519
Mingoia, Q.
Action of ultra-violet light of various frequencies on alkaloid solutions
Ann. chim. applicata, 23 (1933), 318; through *Chem. Abstr.*, 27 (1933), 5889
Oakley, Margarethe
Comparative study of the assays of cinchona bark
Am. J. Pharm., 105 (1933), 535
Raymond-Hamet
New method for the extraction and separation

of the alkaloids of Pseudocinchona africans A. Chev.
Bull. sci. pharmacol., 40 (1933), 523

Tersaka, M.
Investigation of the alkaloids of the root bark of Orixa Japonica III
J. Pharm. Soc. Japan, No. 620 (1933), 219

Vinogradova, E. N.
Conductometric method of determining alkaloids in weak solutions, and morphine in commercial opium
J. Appl. Chem. (U.S.S.R.), 6 (1933), 150; through *Chem. Abstr.*, 27 (1933), 5889

Ware, Alan H., and Smith, Victor
Precipitation of alkaloids by tannins and the use of antipyrine in the detection of tannins
Quart. J. Pharm. & Pharmacol., 6 (1933), 454

ESSENTIAL OILS.

Gstirner, F.
Estimation of essential oil in camomile flowers
Deutsch. Apoth., 2 (1933), 97; through *Chem. Abstr.*, 27 (1933), 5477

Glichitch, L. S., and Naves, Y. R.
Essential oils of Ocimum canum, Sims and O. gratissium L.
Chim. et Ind., 29 (1933), Spec. No. 1029; through *J. Soc. Chem. Ind. Suppl.*, 52 (1933), 939

Glichitch, L. S., and Naves, Y. R.
Determination of primary alcohols in essential oils by phthalic anhydride
Chim. et Ind., 29 (1933), Spec. No. 1024; through *J. Soc. Chem. Ind. Suppl.*, 52 (1933), 939

Huerre, R.
Pseudo iodine indices of essential oils
J. pharm. chim., 18 (1933), 381

Unger, Fritz
Remarks on natural and synthetic menthol
Pharm. Ztg., 78 (1933), 1202

OILS, FATS AND WAXES.

Doree, Charles, and Garratt, Donald C.
Chemistry of lanosterol
J. Soc. Chem. Ind., 52 (1933), 355T

Dyer, F. J.
Relationship between the antimony trichloride blue value of cod liver oils and that of their unsaponifiable fractions
Quart. J. Pharm. & Pharmacol., 6 (1933), 338

Evers, Norman, and Smith, Wilfred
Analytical classification of fish liver oils
Quart. J. Pharm. & Pharmacol., 6 (1933), 329

Éwe, George E.
Medicinal cod liver oil—observations on color and viscosity
JOUR. A. PH. A., 22 (1933), 1080

Éwe, George E.
Cod liver oil—stability of vitamin A content under conditions of commercial distribution
JOUR. A. PH. A., 22 (1933), 1085

Holmes, Arthur D., and Tripp, Francis
Color standards for cod liver oil
JOUR. A. PH. A., 22 (1933), 1102

Kawai, K.
Pharmacognostical studies on Japanese cod liver oil (Cont.)
J. Pharm. Soc. Japan, No. 620 (1933), 183

ANALYTICAL METHODS AND RESULTS.

Allport, Noel L.
New method for the determination of elemental sulphur
Quart. J. Pharm. & Pharmacol., 6 (1933), 431

Bennett, C. T., and Campbell, N. R.
Determination of iron
Quart. J. Pharm. & Pharmacol., 6 (1933), 436

Dyer, F. J.
Estimation of parathyroid hormone
Quart. J. Pharm. & Pharmacol., 6 (1933), 426

Elliott, G. H.
Method for the determination of rate of solution of tablets
Pharm. J., 131 (1933), 514

Ferrey, G. J. W.
Determination of moisture in mercuric oxide
Quart. J. Pharm. & Pharmacol., 6 (1933), 406

Ferrey, G. J. W.
B. P. limit test for more soluble sugars in lactose
Quart. J. Pharm. & Pharmacol., 6 (1933), 411

Glass, Norman
Variation in solubility of calcium lactate
Quart. J. Pharm. & Pharmacol., 6 (1933), 522

Kleschnja, A. M.
Quantitative determination of phenol in ampuls of sodium arsenate
Pharm. Zentralh., 74 (1933), 689

Mayrhofer, A., and Beck, Anatol
Contribution to the characterization and testing of tinctures
Pharm. Presse, Wiss. Heft., 38 (1933), 129

Munch, James, C., *et al.*
Quantitative applications of the modified Türk test
JOUR. A. PH. A., 22 (1933), 1078

Peronnet, Marcel, and Truhaut, René
Color reactions furnished by metadinitrobenzene in alkaline medium
J. pharm. chim., 18 (1933), 339

Powell, A. D., and Hall, G. F.
Determination of acriflavine and related medicinal dyes
Quart. J. Pharm. & Pharmacol., 6 (1933), 389
Powell, A. D.
New color reaction for bismuth
Quart. J. Pharm. & Pharmacol., 6 (1933), 464
Schrader, Hellmuth
Measurement of viscosity as a means of evaluating tinctures
Pharm. Ztg., 78 (1933), 1159
Straub, Johann, and Mihalovitis, Eugen
Microvolumetric determination of bismuth in pharmaceutical preparations
Pharm. Zentralh., 74 (1933), 685
Veness, B. R.
Yield of extractive in unstandardized official extracts
Quart. J. Pharm. & Pharmacol., 6 (1933), 531
von Mikó, Julius
Argentometric estimation of hexamethylenetetramine
Pharm. Zentralh., 74 (1933), 642

ORGANIC CHEMICALS.

Butchers, W. H., *et al.*
Preparation and storage of solutions of tribromethyl alcohol
Quart. J. Pharm. & Pharmacol., 6 (1933), 533
Haddock, L. A.
Changes in acid solutions of adrenaline
Quart. J. Pharm. & Pharmacol., 6 (1933), 496
Kahane, Ernest
Hydrates of paraaminophenylarsinate of sodium
J. pharm. chim., 18 (1933), 134
Morton, C.
Decomposition of acetylsalicylic acid in aqueous solution
Quart. J. Pharm. & Pharmacol., 6 (1933), 492
Preparation of glutathione
Regnier, M. Th.
J. pharm. chim., 18 (1933), 369
Thompson, H. E., and Dragstedt, C. A.
Chemical and pharmacological properties of calcium acetylsalicylate
Jour. A. Ph. A., 22 (1933), 1096

THE IDENTIFICATION OF SOME HYPNOTICS OF THE BARBITURIC ACID SERIES.

BY GEORGE W. HARGREAVES AND H. W. NIXON.

Barbituric acid derivatives due to their wide-spread use as hynotics have become of increased importance in analytical work of a toxicological or pharmaceutical nature.

Numerous qualitative tests have been proposed for barbital and other individual members of this group but no reaction has been applied to a whole series of these compounds. In most cases, only a few derivatives have been investigated. It is necessary to know in using a qualitative test whether it is specific for the substance being tested or whether it may be simulated by some related compound. For this investigation, samples of most of the widely used barbituric acid derivatives were obtained.

After a comprehensive survey of the literature, a number of reactions were selected which might provide a scheme for the detection and positive identification of any member of the group studied. It will be seen from the table of results that this purpose has been accomplished.

EXPERIMENTAL.

Solubility Tests.—The free acids are only sparingly soluble in water but readily dissolve in 5% sodium carbonate or hydroxide. The ethyl isopropyl derivative is used in the form of the calcium salt (Ipral) and is readily soluble in water. Others commonly employed in the form of their sodium salts are the diethyl; phenyl ethyl; ethyl, *l*-methyl butyl (Nembutal) and ethyl isoamyl (Sodium Amytal) barbituric

acids. Acidification of the aqueous solutions of these salts yields a precipitate of the free acid unless the solutions are very highly diluted.

Melting Points.—A variation in melting points was found in the literature for several of these compounds. Recently, Fischer and Kofler (1) have shown that barbital can exist in three modifications. Allyl, isopropyl barbituric acid (2) can exist in two forms.

Para-Nitrobenzyl Derivatives.—Lyons and Dox (3) have used *p*-nitrobenzyl chloride for the identification of barbituric acid derivatives. In addition to those prepared by them, the *p*-nitrobenzyl derivatives of ethyl, *l*-methyl butyl; ethyl, cyclohexenyl; and allyl, isopropyl barbituric acid were prepared.

0.5 Gm. of substance and 0.25 Gm. of sodium carbonate are dissolved in 5 cc. of water, 0.85 Gm. of *p*-nitrobenzyl chloride in 10 cc. of alcohol is added and the mixture refluxed about an hour. If the derivative precipitates during the reaction it is filtered hot. If no precipitate forms, the sample is cooled. If still no precipitate forms, hot water is added until a cloudiness results. Recrystallize from alcohol.

Permanganate Test.—0.05 Gm. of substance is dissolved in 5 cc. of 5% Na_2CO_3 and 5 drops of 0.1*N* permanganate is added. This reaction serves to distinguish "Dial," "Phanadorn" and allyl, isopropyl barbituric acid, and can also be used for the quantitative determination of these substances.

Precipitation Tests.—For these reactions, saturated solutions of the free acids were used. 5-cc. portions of these solutions were tested with 1 cc. of the reagent, then followed by an excess. The precipitants employed were:

Mercuric Nitrate T.S. Mercuric Sulphate T.S. Saturated Aqueous Solution of Mercuric Chloride. Results are given in the table.

COLOR REACTIONS.

Concentrated Sulphuric Acid.—0.1-Gm. samples were treated with a few drops of conc. H_2SO_4. No coloration was observed except in the case of Phanadorn which gave a distinct reaction. This reaction is very sensitive with Phanadorn, a good test being obtained with as small a quantity as one mg.

Formalin Sulphuric Acid (4).—0.01-Gm. samples were treated with 1 cc. of 10% formaldehyde and 4 cc. of conc. H_2SO_4 and observed after standing two minutes at room temperature and were then heated a minute on the water-bath. Results are given in the table.

Nitrite Sulphuric Acid (5).—0.1-Gm. samples were treated with 1 cc. of conc. H_2SO_4 and 2 drops of a 2% sodium nitrite solution and observed first cold and then after heating on the water-bath.

TABLE OF RESULTS.

	B. Acid.	M. p. ° C. Uncorr.	M. p. of Nitrobenzyl Derivative.	Permanganate Test.
1	Diethyl (Barbital)	190–191	192	Negative
2	Ethyl isopropyl (Ipral)	200–203	160	.....
3	Ethyl, *n*-butyl (Neonal)	126–128	146	.....
4	Ethyl, *l*-methyl butyl (Nembutal)	129–130	142	.....
5	Ethyl isoamyl (Amytal)	154–156	138	.....
6	Ethyl phenyl (Luminal)	172–174	182	.....
7	Ethyl cyclohexenyl (Phanodorn)	171–174	195	Positive
8	Allyl isopropyl	138.5–140.5	191	.....
9	Diallyl (Dial)	170–171	190	.....

	$HgSO_4$.	$Hg(NO_3)_2$.	$HgCl_2$.	Conc. H_2SO_4.
1	Precipitate soluble in excess	Precipitate soluble in excess	Negative	No color
2	.....	.....	Slight	.....
3	.....	.....	Positive	.....
4	.....	.....	.....	.....
5	.....	.....	Negative	.....
6	.....	.....	Positive	.....
7	.....	.....	.....	Orange red
8	.....	.....	Negative	No color
9	.....	.....	.....	.....

	Formalin Sulphuric.	Nitrite Sulphuric. Cold.	Hot.		Formalin Sulphuric.	Nitrite Sulphuric. Cold.	Hot.
1	Slight yellow	No color	No color	6	Dark red	Yellow	Yellow
2	.....	...	...	7	Red brown when heated, green fluorescence	Same as with H_2SO_4	Same as with H_2SO_4
3	.....	...	...	8	Negative	Negative	Negative
4	.....	...	...	9	Light yellow, greenish on heating, slight fluorescence	Slight yellow	Red
5	Greenish yellow on heating	...	...				

MICROCHEMICAL REACTIONS.

For one interested in supplementing these tests with microchemical reactions the following references are suggested:

L. Van Itallie and van der Wen, *Pharm. Weekblad*, 56 (1919), 1112-1117; through *C. A.*, 13 (1919), 3277.

L. Van Itallie and Steenhauer, *Ibid.*, 67 (1930), 797-785; through *C. A.*, 24 (1930), 5934.

G. Deniges, "Mikrochemie." (*N. S.*), 3, 316-323; through *C. A.*, 25 (1931), 435-437.

ACKNOWLEDGMENT.

The writers wish to express their appreciation to the following manufacturers who furnished them with generous samples of their respective products: Winthrop Chemical Co., Abbott Laboratories, E. R. Squibb and Sons, Ciba, Hoffmann-La Roche, Eli Lilly and Co.

REFERENCES.

(1) *Arch. Pharm.*, 270 (1932), 207.
(2) *Ibid.*, 270 (1932), 149.
(3) *J. Am. Chem. Soc.*, 51 (1929), 288-291.
(4) *Pharm. Zentralhalle*, 17 (1926), 481-482; through *C. A.*, 20 (1926), 3330.
(5) *Boll. chim.-farm.*, 64 (1926); through *C. A.*, 20 (1926), 477.

ALABAMA POLYTECHNIC INSTITUTE,
SCHOOL OF PHARMACY,
AUBURN, ALABAMA.

DISINFECTANTS IN MINERAL WATER BOTTLES.

The Medical Superintendent Officer of Health of Belfast has received a deputation from mineral water merchants in the city, who drew attention to the practice of utilizing mineral water bottles to hold disinfectants. In support of this contention they had produced mineral water bottles bearing the label, "Carbolic Acid," and the name of the vendor firm.

A PRACTICAL ENTERIC COATING FOR THE RETAIL PHARMACIST.*

BY F. S. BUKEY AND PHYLLIS RHODES.[1]

Several references to the use of gelatin treated with formaldehyde as an enteric coating for pills and capsules are to be found in the literature. The results reported from these researches are varied. Hausmann (1) patented the process of immersing filled capsules in an 0.8 per cent solution of formaldehyde for 18 minutes. Dr. Hans Rumpel (2) patented the process of treating empty capsules with mixtures of formaldehyde and other solvents. He made the claim that the capsules would not harden with age. Smith (3) immersed filled capsules in 10 per cent aqueous solution of formaldehyde for 15 minutes. Ballenger and Elder (4) suggest two methods, one in which the capsule is immersed in 1 part of 40 per cent formaldehyde solution in 40 to 60 parts of water. In the other the capsules are exposed to the vapors of formaldehyde for 6–12 hours. DeLanney (5) reports soaking unfilled capsules in 20 per cent formaldehyde solution for several hours. Scoville (6) immersed filled capsules in a 1 per cent solution of formaldehyde for 30 seconds and suggests that they be stored for two weeks before they are used. In a second paper (7) Scoville states that he uses the same solution concentration and that the capsules will be in good condition for a year. Cooper and Dyer (8) in their textbook, "Dispensing for Pharmaceutical Students," state that filled capsules immersed in *formaldehyde solution B. P. (36 to 38 per cent w/v) for 10 minutes* have an ideal enteric coating. They also claim that the rate of the solution in the pancreatic fluid varies inversely with the length of the formaldehyde treatment. They find that a capsule treated for 5 minutes requires 3 hours for digestion but one treated for 15 minutes digests in 1 hour.

It would seem from the results of the above investigations that almost any concentration of formaldehyde solution could be used in the treatment of enteric coated capsules. It was decided, however, to check some of this work using the X-ray to locate the point of disintegration. Both pills and capsules were used in this study. The pill mass was made of 95 parts barium sulphate, 5 parts althea root and a sufficient quantity of syrup. Methylene blue was also added to some of the masses. The pills were about one-quarter inch in diameter; when dry they were coated with gelatin. The gelatin solution used for the coating was prepared by warming flake gelatin in sufficient water to make a thick solution. It was found that the pill could be removed from the pin used for dipping, without sticking to the fingers, in about two minutes. The small hole left by the pin was sealed by touching this spot with a hot spatula. The gelatin coating was then allowed to harden. Capsules, size O, filled with barium sulphate were used and sealed in the usual manner. The pills and capsules were then ready for immersion in formaldehyde solution.

Each of the subjects in this experiment was given a pill and capsule to be taken at the same time. The first picture was taken one hour after the pills had been swallowed. If the pill and capsule appeared low for the normal position of

* Section on Practical Pharmacy and Dispensing, A. PH. A., Madison meeting, 1933.

[1] The authors wish to express their thanks to Prof. C. L. Wible of the department of Physiology, University of Nebraska, for suggesting the problem.

the stomach, two ounces of Bari-o-meal in eight fluidounces of water were given before the next picture. The second picture was usually taken at the end of the second hour. The barium sulphate outlined the stomach so that the exact position of the pill and capsule could be located. The Bari-o-meal masked the pill and capsule in a very few cases.

The results of the experiment are listed according to the concentration of the aqueous formaldehyde solution and the length of the time immersed. The observations and results are listed as follows:

40% Time 10 Minutes.—Two subjects were used. Pictures were taken for 4 hours, with negative results on disintegration. In one case the pill contained methylene blue and in the other case, the capsule. The urine was not colored in either instance.

40%, Time 1 Minute.—Two subjects were used. Pictures were taken for 7 hours. In one case the pill and capsule were in the stomach at the end of 7 hours. In the other case they remained in the stomach 2 hours and disintegrated in the intestine at the end of 5 hours.

40%, Time 15 Seconds.—Two subjects were used. In one case pictures were taken for 5 hours. Pill and capsule remained in the stomach 3 hours, not disintegrated at the end of 5 hours. In the other case pictures were taken for 3 hours. Pill and capsule remained in the stomach 1 hour. At the end of 3 hours the pill was low in the intestine and the capsule had disintegrated.

20%, Time 15 Seconds.—Two subjects were used. Eight pictures were taken. In one case the pill and capsule were in the stomach at the end of 5 hours and were still intact at the end of 8 hours. In the second case the pill was in the stomach at the end of 8 hours; the capsule was in the intestine intact. In both of these cases methylene blue indicated disintegration at a later time.

10%, Time 4 Minutes.—Three subjects were used. Pictures were taken for 8 hours. In each of the three cases the pill and capsule were in the stomach at the end of 8 hours. Methylene blue gave no evidence of later disintegration.

10%, Time 15 Seconds.—Four subjects were used. In one case five pictures were taken. The pill left the stomach in 2.5 hours and disintegrated in the intestine in 2 hours. The capsule remained in the stomach 3 hours and disintegrated in the intestine in 2 hours. In the second case, six pictures were taken. The pill and capsule remained in the stomach 4 hours and disintegrated in the intestine in 2 hours. In the third case seven pictures were taken. Pill and capsule left the stomach in 3 hours. The capsule disintegrated in the intestine in 4 hours but the pill remained intact. In the fourth subject both the pill and capsule were in the stomach at the end of 7 hours.

10%, Time 10 Seconds.—Two subjects were used. In one case six pictures were taken. The pill disintegrated in the intestine in 3 hours and the capsule in 5 hours. In the second subject the fate of the pill was unknown but the capsule disintegrated in the intestine in 5 hours.

10%, Time 5 Seconds.—Two subjects were used in this experiment, both reacted in almost the same manner. Five pictures were taken of each. The pill and capsule remained in the stomach 2 hours and disintegrated in the intestine in 2 hours.

5%, Time 2 Seconds.—Three subjects were used; with the first, five pictures were taken. The capsule was in the stomach at the end of 5 hours and the pill disintegrated there. With the second subject, nine pictures were taken. The capsule was intact in the stomach at the end of 9 hours and the pill disintegrated there in 7 hours. The third subject had two pictures taken. Both the pill and capsule were out of the stomach in 1 hour, and disintegrated in the intestine sometime in the second hour.

The results of these experiments show that the time of disintegration does not vary inversely with the length of immersion, as Cooper and Dyer have stated. They used the artificial pancreatic digestion method of testing and this may be the cause for the results they report.

The above experiments also show that several of the other early investigators were using too strong a solution of formaldehyde, thus producing a pill or capsule

which would pass through the digestive tract without disintegration. A considerable variation was noted in the time that was required for the pill and capsule to leave the stomach. In one subject, it was noted that the pill and capsule would remain in the stomach after a meal had passed through it. This condition seemed to be normal for this individual as the same results were obtained in three different experiments.

A formaldehyde concentration of 10 per cent and an immersion time of 5 seconds was considered to be the best method. This gave a disintegration in the upper intestine, which is usually desirable. If further penetration is desired, the 10- or 15-second immersion would be better.

We do not believe that the gelatin coating, formaldehyde treated, would be ideal for commercial products because of the mechanical difficulties which would develop. The method could be used successfully, however, by the pharmacist who may have an occasional call for a small number of specially prepared capsules. No extra equipment is necessary and the product, when dry, is not unsightly. The pharmacist must be careful that the capsules are well sealed or the contents are in some danger of becoming wet with the formaldehyde solution.

BIBLIOGRAPHY.

(1) Hausmann, D. R., Patent No. 85807 (Aug. 1895).
(2) Rumpel, D. R., Patent No. 167318 (Oct. 1904).
(3) Smith, cited by Cook *Am. J. Pharm.*, 86 (1914), 185.
(4) Ballenger and Elder, *Jour. A. M. A.*, 62 (1914), 197.
(5) DeLanney, *The Military Surgeon*, 35 (1914), 320.
(6) Scoville, *Southern Pharm. J.*, 7 (1915), 745.
(7) Scoville, JOUR. A. PH. A., 7 (1918), 363.
(8) Cooper and Dyer Textbook—"Dispensing for Pharmaceutical Students."

COLLEGE OF PHARMACY,
UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA.

A PROPOSED FORMULA FOR BELLADONNA OINTMENT.*

BY C. O. LEE AND H. C. HOCH.[1]

Therapeutically, ointment of belladonna seems to have, for the most part, justified the claims made for it. Pharmaceutically, however, many complaints have been made about the present official formula. Chief among these are:

1. That it stains due to the presence of chlorophyll in the pilular extract.
2. It is difficult to rub the extract smooth previous to incorporation in the base. This may be due, in part, to the character and quality of the extract.
3. The finished product is too sticky.

Believing that it should be possible to prepare a satisfactory belladonna ointment free from the objections enumerated, prompted this study.

---

* Section on Practical Pharmacy and Dispensing, Madison meeting, 1933.

[1] Professor of Pharmacognosy, School of Pharmacy, Medical College of the State of South Carolina, Charleston. Graduate Student, School of Pharmacy, Purdue University.

PILULAR EXTRACT OF BELLADONNA IN VARIOUS OINTMENT BASES.

Nine ointments composed of the same amount of pilular extract of belladonna were prepared, using as many different bases with respect to composition or proportions of the various ingredients. The procedure consisted in rubbing the extract to a smooth paste with the alcohol and incorporating it in the fats, after the manner usually prescribed.

These ointments were prepared and studied under varying temperature conditions, for purposes of comparing consistency and keeping properties. For this study samples of the ointments were subjected to summer heat (room temperature), oven heat at 35° C. and to the electric refrigerator.

These ointments and their formulas are given in Table I following:

TABLE I.

Formula Amounts in Gm.	1.[a]	2.[b]	3.[c]	4.	5.	6.	7.	8.	9.
Extract belladonna pilular	10	10	10	10	10	10	10	10	10
Alcohol, dilute	5	5	10	5	5	5	5	..	..
Wool fat, anhydrous	30	30	20	..	..	..	..	..	..
Lard, benzoinated	55	..	60	..	..	..	..	..	..
Wax, yellow	..	5	..	..	..	..	..	..	..
Petrolatum	..	50	..	..	..	..	..	..	..
Purdue base[d]	..	..	..	85	..	..	..	85	85
Bibbins' base[d]	..	..	..	..	85	..	..	..	..
Lascoff base[d]	..	..	..	..	..	85	..	..	..
B. P. (1932) base[d]	..	..	..	..	..	..	85	..	..
Magnesium stearate[e]	..	..	..	..	..	..	..	5	..
Oleic acid	..	..	..	..	..	..	..	..	5

[a] U. S. P. IX formula.
[b] U. S. P. X formula.
[c] B. P. (1914) formula.
[d] See Table II for the composition of these bases.
[e] A saturated solution in dilute alcohol used.

Comments.—Of the formulas in Table I, No. 1 had to be rejected because it was too thin. This may have been due, in part at least, to the quality of the lard. Formula No. 3 of about the same composition and consistency was also discarded early in the study. Number 5, made with the Bibbins' base was of good consistency but a little sticky. Compared to this, the Lascoff base made ointment No. 6 even more sticky than No. 5. This stickiness is attributed to the presence of proportionately larger amounts of wool fat in the bases, since formulas Nos. 4 and 7 were free from this objection. We do not regard stickiness, such as these showed, a serious fault.

The use of magnesium stearate in No. 8 did not indicate any improvement over the other formulas. In Formula 9, the oleic acid not being miscible with the extract, made it impossible to get a smooth ointment.

In Table II, following, is given the composition of the bases used in making four of the ointments in Table I. These have all been considered and tried by various members of the Revision Committee of the Pharmacopœia, XI (Sub.-Com. 13, Bull. 13).

TABLE II.

Constituents.	Ointment Bases. Purdue.	Bibbins.	Lascoff.	B. P. (1932).
Wool fat	5	15	20	5
White wax	5	10	15	..
White petrolatum	90	75	65	85
Paraffin	..	..	..	10

Each is prepared by fusing the ingredients upon a water-bath and stirring, just enough, while cooling to insure thorough mixing.

FLUIDEXTRACT OF BELLADONNA IN BELLADONNA OINTMENTS.

Since there is the problem of getting a smooth paste with the extract of belladonna and the alcohol, as prescribed in the official formula, it was thought that this trouble might be eliminated by starting with the proper amount of the fluidextract as in the B. P. (1914). A number of ointments were therefore prepared, using fluidextract of belladonna root instead of the extract as officially prescribed. These are shown in Table III, in which the formulas are given.

TABLE III.

Formula Ingredients in Gm.	10.	11.	12.	13.	14.
Fluidextract belladonna root	30	30	30	30	30
Purdue base[1]	90	90	90	90	89
Magnesium stearate	..	..	..	.01	..
Oleic acid	..	..	..	..	1

[1] See Table II for formula.

Procedure.—The methods of making are somewhat different for each and will be given separately.

In No. 10, the fluidextract was evaporated, on a water-bath, to 10 Gm., cooled and incorporated in the base in the usual way. For No. 11, the fluidextract was evaporated as for No. 10, the base was then melted and added to the concentrated fluidextract and stirred until congealed. In Formula 12, the concentrated fluidextract was added to the melted base and the mixture stirred while congealing. In Formula 13, the magnesium stearate was added to the fluidextract previous to concentrating the latter. To this the melted base was added gradually with stirring until it congealed. For No. 14, the fluidextract and oleic acid were heated on the water-bath until reduced to 11 Gm. After the residue had cooled, the base was incorporated.

Comments.—In preparing this group of ointments, it was observed that when the concentrated fluidextract was incorporated in the cold base, as for ointment 10, droplets appeared in the finished product. These did not appear when the base was melted, previous to mixing it with the concentrated fluidextract, as was done with ointments 11 and 12.

The addition of magnesium stearate in ointment 13 did not seem to alter the appearance of the finished ointment. The use of oleic acid did not seem to cause the trouble in ointment 14 that it did in ointment 9, perhaps due to the use of heat in making the former.

The question as to whether the use of magnesium oleate and oleic acid in

these ointments affected the alkaloids present will have to be determined by further experimentation.

Finally there is this to be said for this group of ointments: 1, the question of getting a smooth ointment was entirely solved; 2, the low lanolin content of Purdue base yielded ointments free from the stickiness so often observed; 3, the use of belladonna root, instead of the highly colored extract, eliminated the undesirable staining properties of the present official ointment, and 4, the process of making is simple and comparatively easy.

OINTMENT OF BELLADONNA IN A CHOLESTERIN-CONTAINING BASE.

The presence of cholesterin in small amounts in petrolatum and other bases and base constituents such as wax, are reputed to greatly increase the water-holding property of the base. Two bases, Nos. 15 and 16, were, therefore, prepared each containing 1.5% cholesterin. The formulas were:

Number 15—Petrolatum, white	98.5 Gm.
Cholesterin	1.5 Gm.
Number 16—Petrolatum	93.75 Gm.
White wax	4.75 Gm.
Cholesterin	1.50 Gm.

Each was prepared by melting the ingredients upon a water-bath and stirring until cool.

When tested for their water-absorbing properties, Formula 15 easily took up 30 per cent of water which was not removed by melting the base upon a water-bath. It was found that Formula 16 took up somewhat more water, indicating that wax increases the water-holding property of such mixtures.

In view of the observations made with bases 15 and 16, it was decided to prepare an ointment of belladonna from fluidextract of belladonna root and base No. 16. The ointment which resulted was free from stickiness, of splendid consistency, had good spreading properties and was not difficult to prepare. When assayed according to the method of Deal, *J. A. O. A. C.*, 15 (1932), 442–446, the results were found to check favorably with those of an equivalent amount of the fluidextract as a control.

We, therefore, wish to suggest that we believe that the following formula for belladonna ointment would make a desirable preparation. It is free from most of the objectionable features of the present official formula. The proposed formula is as follows:

Fluidextract belladonna root	28.00 cc.
Cholesterin	1.50 Gm.
White wax	5.00 Gm.
White petrolatum	83.50 Gm.

Procedure.—Concentrate the fluidextract upon a water-bath to 10 Gm. Add to this the melted base, slowly and with stirring, until cool.

PURDUE UNIVERSITY SCHOOL OF PHARMACY,
LA FAYETTE, INDIANA.

PRESCRIPTION ACCURACY AS SHOWN BY STATE BOARD OF PHARMACY EXAMINATIONS—A PRELIMINARY STUDY.*

BY ROBERT L. SWAIN.

As a member of the Committee on Prescription Tolerances, appointed by President W. Bruce Philip, of the AMERICAN PHARMACEUTICAL ASSOCIATION, I requested the Maryland Board of Pharmacy to coöperate by turning over to me certain prescriptions compounded by applicants appearing before the Board on June 5th. Two prescriptions constitute the basis for this preliminary report:

(*a*) Sodium Bicarbonate
Charcoal Powd. āā grains lxxv
To be made into ten powders.

(*b*) Quinine Sulphate
Aloes Pulv. āā grains x
To be made into ten pills.

The various powders and pills, turned in by thirty-five applicants for the practical examination, were carefully checked and weighed upon analytic balances in the Bureau of Chemistry of the Maryland State Department of Health. The results show the weight of each powder or pill turned in by each applicant. This permits a full consideration of the work done by each compounder, including the variations existing between the individual powders and pills in each instance. It was thought that such a procedure would strongly indicate the skill and accuracy with which the prescriptions were compounded.

Simply as an effort to present a fair opinion upon the results obtained, eleven of the prescriptions for powders were accepted as satisfactory. The basis for acceptance was more or less indefinite, and depended largely upon my own conception of what degree of accuracy should prevail. However, before arriving at the final conclusion, I gave careful scrutiny to the entire number of powders, and simply selected the number that appeared to me to be more uniform in weight, more closely conforming to the average weight, and showed less deviation in weight as between individual powders. Twenty-four of the prescriptions were not considered acceptable when judged in the same manner. It should be added that no information is available regarding the methods of division. The results in some cases were so uniform as to indicate that each powder was weighed. As a rule, however, the facts suggested division in the usual manner.

I should like to say here that some very valuable studies of prescription compounding have been made by Prof. Marvin J. Andrews of the School of Pharmacy, University of Maryland. Some of his findings have been published, or will be published in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION. He has worked out the average standard deviation for several frequently met with prescriptions. I shall not discuss his procedure, as it is a bit complicated and exceedingly laborious, but I suggest that his results be carefully studied as it is a constructive and fundamental piece of work. Applying Professor Andrew's conclusions to the powder prescription discussed here, it is shown that each powder should contain not less than 13.92 grains.

* Section on Practical Pharmacy and Dispensing, A. PH. A., Madison meeting, 1933.

The prescriptions for pills were more consistently satisfactory than the powders. Only four were regarded as altogether unsatisfactory. I might add that the basis for acceptance was almost entirely uniformity in weight. The excipient was not specified, and this made it impossible to consider difference in weight as between different compounders.

PILLS CONSIDERED SATISFACTORY.

No. 1:	2.70	2.70	2.71	2.82	2.96	2.98	3.12	3.13	3.26
No. 2:	3.64	3.70	3.77	3.78	3.87	4.00	4.07	4.07	4.26
No. 3:	2.10	2.42	2.45	2.69	2.78	2.79	2.82	2.89	3.01
No. 4:	2.25	2.28	2.47	2.50	2.68	2.68	2.76	2.78	2.93
No. 6:	2.33	2.42	2.47	2.58	2.62	2.67	2.79	2.79	2.84
No. 8:	2.42	2.48	2.50	2.61	2.67	2.82	2.98	3.01	3.04
No. 17:	3.40	3.66	3.70	3.86	3.89	3.90	4.04	4.21	4.21
No. 20:	2.39	2.50	2.59	2.59	2.62	3.64	2.68	2.81	2.87
No. 23:	2.19	2.48	2.58	2.75	2.82	2.81	2.90	2.99	3.10
No. 24:	2.18	2.24	2.31	2.39	2.41	2.44	2.44	2.70	2.72
No. 26:	2.38	2.70	2.76	2.78	2.79	2.93	2 90	3.01	3.16
No. 28:	2.07	2.08	2.21	2.23	2.30	2.32	2.35	2.38	2.49
No. 29:	1.74	2.24	2.30	2.44	2.45	2.49	2.56	2.65	2.69
No. 30:	2.18	2.22	2.28	2.31	2.33	2.35	2.41	2.50	2.53
No. 31:	3.02	3.07	3.21	3.47	3.50	3.60	3.64	3.72	3.78
No. 32:	2.38	2.47	2.59	2.65	2.70	2.73	2.76	2.78	2.93
No. 34:	2.13	2.16	2.21	2.34	2.45	2.50	2.56	2.56	2.59
No. 37:	2.56	2.72	2.80	2.96	3.13	3.24	3.26	3.38	3.53
No. 40:	2.10	2.16	2.22	2.25	2.25	2.30	2.41	2.41	2.95
No. 42:	2.55	2.55	2.59	2.72	2.72	2.72	2.78	2.93	3.12
No. 44:	2.04	2.16	2.36	2.42	2.42	2.50	2.56	2.70	3.09
No. 46:	2.75	2.89	2.90	2.99	3.01	3.02	3.02	3.04	3.07
No. 47:	3.41	3.07	3.32	3.36	3.36	3.41	3.46	3.53	3.80
No. 48:	2.62	2.90	2.96	3.13	3.15	3.35	3.36	3.38	3.49
No. 50:	2.42	2.62	2.62	2.78	2.81	2.82	2.92	2.93	2.99
No. 51:	3.05	3.27	3.29	3.29	3.39	3.44	4.52	3.90	3.93
No. 52:	2.73	2.85	2.92	3.06	3.09	3.11	3.18	3.32	3.39
No. 53:	1.93	1.93	2.05	2.14	2.19	2.21	2.21	2.22	2.24
No. 56:	3.10	3.26	3.39	3.53	3.53	3.73	3.73	3.90	3.92
No. 58:	2.61	2.65	2.65	2.85	2.90	2.96	2.98	3.09	3.33
No. 60:	2.67	2.85	2.90	2.93	2.96	3.07	3.09	3.15	3.19

PILLS CONSIDERED UNSATISFACTORY.

No. 5:	1.43	1.43	1.50	1.54	1.54	1.59	1.61	1.68	1.96
No. 25:	1.81	1.81	1.87	1.90	1.98	2.02	2.07	2.07	2.21
No. 41:	1.42	1.45	1.50	1.57	1.57	1.62	1.65	1.67	1.79
No. 57:	1.16	1.23	1.23	1.26	1.28	1.31	1.40	1.40	1.57

I am presenting this report as a preliminary study. I do not know just how valuable this data may prove to be in arriving at a conclusion as to what degree of accuracy should prevail in prescription practice, but I am certain it will be of suggestive value. In fact, a full study of the whole field of prescription compounding may well prove that no arbitrary standard can be set up. At any rate, the study will be continued until definite and authoritative conclusions are possible.

POWDERS CONSIDERED SATISFACTORY.

No. 3:	11.84	12.66	13.16	13.33	13.46	13.89	15.97	16.28	16.52	18.73
No. 8:	13.76	14.06	14.34	14.41	14.47	14.55	14.65	14.76	14.95	15.21
No. 17:	15.66	15.71	15.85	16.25	16.66	16.70	16.77	16.77	16.79	16.80
No. 34:	13.29	14.10	14.59	14.50	14.62	14.79	15.25	15.27	15.50	16.48
No. 42:	12.56	14.04	14.52	14.88	15.00	15.01	15.01	15.50	15.69	16.71
No. 46:	12.43	12.94	15.07	15.20	15.45	15.79	16.61	16.77	16.97	17.05
No. 47:	14.01	14.45	14.56	14.85	15.11	15.15	15.28	15.41	15.45	16.86
No. 48:	12.15	12.41	13.57	13.36	13.87	13.89	13.98	14.12	15.27	15.39
No. 50:	12.76	13.61	13.65	13.87	14.07	14.52	15.59	15.94	16.49	17.49
No. 51:	13.18	13.27	13.87	14.29	14.98	15.00	15.30	16.13	16.52	16.90
No. 53:	14.49	14.59	14.92	15.12	15.33	15.35	15.35	15.56	15.70	17.00

POWDERS CONSIDERED UNSATISFACTORY.

No. 1:	9.06	9.66	13.25	14.48	15.54	16.06	16.25	16.45	16.59	18.78
No. 2:	11.45	12.51	12.84	13.96	14.07	15.19	15.30	15.36	16.15	16.16
No. 4:	14.78	16.06	16.56	16.90	17.58	17.85	18.01	18.18	20.41	26.38
No. 5:	11.67	12.02	12.91	14.43	14.60	15.45	15.62	16.02	16.56	17.26
No. 6:	11.70	12.01	12.99	13.01	13.24	13.48	13.61	13.95	14.04	15.06
No. 20:	11.49	12.68	13.50	13.92	14.17	14.96	15.65	15.80	16.43	17.85
No. 23:	10.33	10.75	10.88	13.05	13.21	14.56	14.58	15.35	19.15	19.36
No. 24:	8.93	10.86	12.45	12.52	13.46	15.32	15.45	16.25	16.88	17.01
No. 25:	10.65	11.92	12.11	12.49	13.01	13.32	15.08	15.38	15.73	15.73
No. 26:	8.31	11.56	12.52	13.17	14.80	15.37	15.60	17.07	17.45	19.32
No. 28:	10.31	11.82	12.06	12.19	12.82	13.19	13.40	13.71	14.21	14.56
No. 29:	10.65	12.21	12.86	13.65	15.19	15.70	16.00	16.32	16.51	16.79
No. 30:	10.15	10.31	10.74	11.06	11.46	11.68	11.92	12.46	12.60	13.27
No. 31:	11.54	12.25	12.97	13.40	13.84	14.35	14.44	15.09	15.27	15.87
No. 32:	9.98	11.32	11.35	11.71	12.19	12.99	13.43	13.55	13.71	14.78
No. 37.	12.04	12.73	13.38	13.65	13.76	14.05	14.20	14.38	14.90	15.41
No. 40:	11.64	12.20	12.90	13.10	13.27	13.35	13.70	14.01	14.23	15.19
No. 41:	10.11	10.95	13.00	13.04	13.34	13.83	14.14	14.30	15.33	15.35
No. 44:	10.18	11.00	11.82	12.45	12.60	13.75	14.07	14.48	14.61	15.82
No. 52:	12.59	12.78	12.80	13.64	14.74	15.56	15.56	16.15	16.67	17.67
No. 56:	11.64	12.57	12.65	12.80	12.83	12.93	13.10	13.68	14.36	15.21
No. 57:	12.08	12.76	12.91	13.34	13.45	13.58	14.06	14.12	14.48	15.43
No. 58:	10.19	11.94	12.18	12.82	13.05	14.08	15.94	16.80	16.99	18.90
No. 60:	12.35	13.05	13.59	14.66	14.85	15.29	15.35	15.84	16.05	17.61

ABSTRACT OF DISCUSSION.

E. D. Stanley inquired whether accuracy had any relation to the ingredients. The author hoped that greater accuracy would be obtained with more potent ingredients; he stated that there is unlimited possibility of deviation; his conclusions were based on the weight of the finished product. In reply to a question, the author stated that he has been making a study of the legal aspects of such deviations; he cited a Maine case where the work had been carelessly done. The Court reviewed the various methods of weighing powders and observed that the customary method of the profession may be wrong; hence, it is not merely an academic question; the most accurate method is that of weighing the individual ingredients.

D. F. Jones asked if the error, in many cases, might not be attributable to trituration. **Mr. Swain** expressed his interest in the work of Mr. Andrews; the work is done with uniform apparatus and under uniform conditions, none of the variables of the pharmacy are present; this work is to determine tolerance under ideal as well as under adverse or average conditions, in the laboratory.

I. A. Becker, Rowland Jones, Marvin Andrews and **L. W. Rising** discussed balances and graduates; other discussions related to the variance in therapeutic results due to variation in weights and measures.

BINDING UP A WOUND.

BY FRED B. KILMER.

(*Continued from page 1126.*)

The name of a Glasgow surgeon, Joseph Lister, is associated with the inception of antiseptic surgery. Lister was not the creator of antisepsis, nor the inventor of antiseptic wound dressing. He merely organized and applied the researches which had gone before. His famous carbolic dressings hark back to the tar and pitch of ancient Egypt. Antiseptic applications to wounds had been made sporadically through the centuries. Lister erected them into a system. Lister impregnated lint, bandages, cotton and gauze with antiseptics, and applied them to wounds. Suppuration was banished and the wounds healed. Simple, but wonderfully effective. Even under the now-considered crude and cumbersome methods of Listerism, the mortality in major operations at once dropped from a range of 45–65 per cent to the then marvelously low figure of 6 per cent. Truly a surgical revolution.

Lister's measures were in essence methods of cleanliness. The antiseptics were cleansing agents, "angels of cleanliness." Infecting organisms, bacteria or germs present on the hands, instruments or skin of the patient were destroyed and their growth was prevented. Wounds healed rapidly—by first intention. No inflammation—no pus—no gangrene—no infection.

This was a wild idea, according to Lister's fellow surgeons. Nobody believed it possible, except Lister's wife, who helped him to do it. Lister devised a system of dressings and methods that turned the surgical world completely around. He sprayed the air with a carbolic solution that set everybody choking and coughing. This he soon abandoned as unnecessary. He dipped lint and gauze in solutions of boracic acid, carbolic acid, corrosive sublimate and other germ-destroying agents, and covered the wounds with them. Thus, in Lister's kitchen, with the aid of Lady Lister, a wash tub and a clothes wringer, began the great system of antiseptic pads, bandages, cottons, gauzes and dressings which later played so large a part in wound healing.

The idea, however, did not go over easily. Lister's English colleagues fought hard against the methods. French surgeons took to it more kindly, but not with rapidity. The German surgeons adopted it enthusiastically, and added iodoform, salicyclic acid, mercury compounds and a dozen other antiseptic chemicals. The American surgeons held aloof. A few of them went overseas and came back convinced. For the most part, the profession in our land for a time rigidly ignored, then took it up, and carried it forward eagerly.

As the years went on, Lister, weakening his solutions, modified his methods. While the foundation principles of Listerism were not changed, and still remain, the pads, bandages and dressings were to a degree modified and changed from *antiseptic to aseptic*.

If we study the meaning of a few words, perhaps we shall better understand the change:

Antiseptic—Anti—against; sepsis—poison; an antiseptic dressing contains a substance which will either destroy or prevent the growth of a living organism (a germ) which will produce infection or poison.

Aseptic—A—free from; sepsis—poison; an aseptic dressing is one which is free from any living organism (germ) which will produce infection or poison.

A *sterilized* dressing is one which by passing through some process (heating etc.) which has destroyed any living organism (germ) is rendered sterile.

One could take a bandage, dip it in a solution of carbolic acid—an antiseptic, wash away the carbolic acid, and there would remain an *aseptic or sterile* bandage.

If we steamed, boiled or heated a bandage it would become *aseptic or sterile.*

Thus Lister's antiseptic dressings in the course of time were transformed into *aseptic or sterile* dressings.

Lister himself heated some of his dressings and made them sterile. But he preferred to use dressings which were impregnated with antiseptics.

The Continental surgeons still, to a considerable extent, use antiseptic dressings. They have adopted many of the newer antiseptics. American surgeons, in the larger part, employ aseptic material sterilized by heat (steam pressure).

In addition to the use of sterile or aseptic material in surgery, elaborate and somewhat complicated methods are employed in the sterilization of apparatus, instruments, the cleansing of the field of operation and of the hands and clothing of the operator, etc. The objective is to keep out or destroy deleterious organisms and protect the wound from infection.

First aid to the injured took orderly shape under Listerism. First aid in its true aspect means that when a person is injured, and especially when the flesh is broken, the wounded part shall at once be covered with a suitable bandage to prevent further injury, and specifically to prevent the entrance of the germs of infection into the broken flesh. Slowly the idea spread—at first in industry, where it was found that first-aid measures would reduce the extent of the injury, prevent infection, and result in a saving of money loss in wages, compensation, etc. Many states in the Union now require that industries shall have at hand suitable bandages and dressings for the prompt application of first aid. Railway and transportation lines also provide equipment, including bandages for the application of first aid. In military practice every soldier carries attached to his belt a package of dressings for use on the battle-field.

A feature of first-aid bandaging is the use of the famous triangular bandage. Originating in the ancient use of the handkerchief in wound dressing, the modern triangular bandage was introduced in 1832. The renowned surgeon, Esmarch of Kiel, added the printing of illustrations upon the bandage showing its application. It is now known as the Esmarch bandage. It is used extensively in military and in lay first aid.

First-aid outfits are supplied for factory, shop, home, automobile and transportation vehicles.

The treatment and after-care of injuries, the administration of medicines, the diagnosis and treatment of disease are no part of first-aid work. The first-aid worker covers the wound with a bandage and stops.

When the present era of surgery arrived, the principal dressing materials in use were lint, non-absorbent cotton, muslin, linen and flannel bandages. In a limited way these materials are still in use. With the antisepsis of Lister and the later modification to asepsis, cotton was made absorbent. Cheese-cloth was converted into what we now term "absorbent" or "surgical" gauze. Some years

prior to the World War absorbent paper in sheets was introduced under the name of "cellulose wadding" as a substitute for cotton. Paper tissue is absorbent, but it lacks the elasticity of cotton fibre. Paper has been spun into a thread and woven into a fabric. For mechanical uses, especially, adhesive masses have been spread upon paper fabrics. In recent times some of the newer fabrics, including rayon, crepes, elastic fabric of rubber and cotton, cellophane and metallic foils, have been brought into use. And at the present time we have cotton, gauze and paper made into sheets, pads, compresses, napkins, sponges, tampons, bandages and other forms without end. These are used in surgery, dentistry and in the shop and the household. In modern times the use of cotton, gauze and even adhesive plaster for toilet, household and mechanical purposes rivals and in some instances exceeds the consumption in surgery.

The rapid introduction of the Listerian dressings and the present-day sterile or aseptic dressings has been due to the enterprise of the manufacturers, greatly aided by their distribution through the drug trade. Lister made his own dressings. Upon their acceptance in this country the hospitals undertook to make them for their own use. A few surgeons installed in their offices apparatus for impregnating gauze with antiseptics, machines for cutting and rolling bandages, etc.

The British and the U. S. Pharmacopœias recognize absorbent cotton. The British Pharmaceutical Codex establishes standards for various gauzes and dressings under the designation "Carbasus." In several of the foreign Pharmacopœias absorbent cotton is official.

Hager's "Handbuch der Pharmaceutischen Praxis" contains a chapter on "Verbandstoffe" in which the preparation of surgical dressing material including cotton, gauze, bandages and ligatures is outlined, and instructions are given for their impregnation with antiseptics and sterilization. Illustrations of apparatus for the preparation of these materials are shown. In many pharmacies in Germany and Continental countries the preparation of these dressings is a prominent activity.

The pharmacist has been an important factor in this phase of the progress of surgery and surgical dressings. He has been the distributor. Through the agency of the retail druggist the surgeon in any remote corner of the land can obtain the type of dressing needed. Without the druggist's kindly aid, surgical progress would have been slow.

Rather lamentable is the fact that the pharmacist has been content to remain simply a distributor of surgical dressing material. For the most part, he has failed to make himself a factor in surgical progress. He left it to the manufacturer to fabricate and exploit new forms of dressings. He did not keep pace with the increased use of these materials stimulated by the great first-aid movements that have encompassed the land. He dispensed over the counter that which the buyer asked for, and let it go at that.

Such a condition still prevails. In the up-to-date drug store we see counters, show-cases and windows filled with cut-rate medicines returning little or no profit. On the other hand, bandages, cotton, gauze, wound dressings and first-aid materials which afford a fairly long range of profits are put under counters and in closets—out of sight. They are not shown, nor is their sale pushed. One druggist, when asked the reason for this custom, replied: "When customers come into my store I don't

want them to think about such unpleasant things as sickness, accidents or injuries." And so the exploitation of bandages, gauze, cotton, etc., is taboo.

In taking this attitude, the druggist overlooks the fact that increased sale of this class of items would add to his reputation, prestige and profits. They are in reality "home needs," "home necessities," capable of a greatly extended use. While their use in caring for wounds and injuries is large, their use in the arts, the home, the shop and other walks of life is extending daily. For absorbent gauze or so-called "surgical gauze" there are a thousand uses in the ordinary paths of life entirely foreign to wound dressing. Many times more absorbent cotton is being used in the household and shop than in wound treatment. Beyond the medical and surgical uses of adhesive plaster lies a field of mechanical uses far exceeding all other forms of application, and seemingly unlimited. The agency of the retail druggist in the distribution of these items for surgical use stands to his credit. It is to be feared that he has not kept pace with their more modern uses. He has in a great measure allowed the trade to slip over to the dry goods store, the hardware dealer and the knick-knack shop.

The art of binding up a wound begins with primal man. Through the ages it has developed slowly, following the changes in civilization and the advancement of the surgical art. Certain forms of bandages and methods of application have been carried through the centuries. The trend of modern surgical practice is toward the simplification of bandages and dressings. The amount of material used per individual operation has notably decreased. This is balanced by the increase in the number of operations performed.

The embalmers and the barber surgeons were important factors in the development of surgical bandages. The apothecary or pharmacist, either when merged with the medical art or when separated from it, has been a factor in the preparation and application of surgical dressings. In modern times the rôle of the pharmacist is largely that of a distributor.

PUBLICITY AND THE PHARMACIST.*

BY ALICE-ESTHER GARVIN.

The attitude of most pharmacists toward unfavorable publicity reminds me of the man who kept hitting himself on the head with a hammer because it felt so good when he stopped. We have emerged from the Victorian and early Georgian period of overweening modesty, and it would seem not only feasible but absolutely essential that the present-day pharmacist seek favorable publicity not only for his profession in general, but also for himself. The slogan, "Your pharmacist is more than a merchant" has been helpful, but we need more and more news about the individual druggist—about you men in this audience to-day. As Byron so aptly said,

> "'Words are things, and a small drop of ink
> Falling, like dew, upon a thought, produces
> That which makes thousands, perhaps millions, think,"

---

* Section on Commercial Interests, A. PH. A., Madison meeting, 1933.

[1] Lecturer in English, Connecticut College of Pharmacy, New Haven.

and we want the public to think about us, and to know of our accomplishments and exploits.

In the first place, we are living in a "hard-boiled" age. The reading public, with their senses dulled by a long period of disappointments, will not believe that the druggist is more than a merchant, nor that he is a professional man, nor that he is even a human being, unless these facts are brought forcibly and frequently to their attention through the medium of the most powerful force in the world—the columns of the public press. Let the attention of people be focused upon the important things being done in this workaday world by the local druggist; let them see his name, or his picture, or a photograph of his store. *No one* may be successful to-day without publicity, and certainly proof of that may be found in the President's campaign for national recovery; every daily paper in the country carries a news story from Washington, and, while I do not mean to imply that the average druggist means as much to a city editor as members of the Cabinet (even *I* am not so impertinent as to think that) *I do* mean that the average druggist may be a source of benefit to his profession, to himself, and to the circulation of the local paper, if he is willing to stay awake on sentry duty.

Every newspaperman is looking for news. I'm sure you've all heard the little poem addressed to them:

"So here's to the gallant reporters!
The boys with the pencils and pads—
Those calm, undisturbable, cool, imperturable, nervy, inquisitive lads.
Each time that we pick up a paper,
Their marvelous deeds we should bless—
Those bold, reprehensible, brave, indispensable, sensible lads of the Press."

I think it is not fallacious to assume, in this connection, that a professional man is stronger meat for headlines than one of the prehistoric Forgotten Men, and so, if a druggist is convicted of a law violation; or beats his wife; or substitutes one preparation for another; or is arrested for speeding; or is out of antitoxin and the child dies; or leaves his store "uncovered" while he is attending a convention or playing golf; or attends a stag party where the entertainment may be more or less questionable, the daily press may carry a glaring headline which will damn him seriously and permanently in the eyes of his customers. He suffers, his family suffers, and the profession of pharmacy is kicked down a few more stairs. If one druggist, or his clerk, fills a prescription incorrectly with dire results for the patient, the inevitable result will be a news item of irreparable damage to the man's reputation, a loss of public confidence in the store, and the maligning of the entire profession. We are a nation of generalizers. If a pharmacist is careless in the compounding of *one* prescription, (we think) he must be equally careless in the compounding of *all* prescriptions; and, by the same token, if *one* pharmacist is careless in the compounding of a prescription, *all* pharmacists must be careless. The average reader knows little of syllogisms.

To offset debâcles of this type, we need publicity of a favorable nature; I wish it were possible to have in every paper, every day, an item about a pharmacist or pharmacy, so that we might gradually bring about a recognition of the druggist's value to his community. For example, this has been a legislative year, and many laws of benefit to public health have been enacted, through the efforts of the phar-

macists, in the several states. These should have been bruited about until every reader of every newspaper in every city, town and village was deeply cognizant of the work being done by his fellow townsmen. Copies of addresses made by speakers at conventions, or addresses made by local pharmacists, should be sent to the newspapers with a release-for-publication date; many pharmacists are doing research work in their laboratories — work of interest and value to the public—work that would make fine news stories; let the local papers be given an opportunity to tell them. Ofte a druggist is elected to public office, not necessarily concomitant to his profession, but possibly a civic office, or one in a club, fraternity or society. This would be of interest to his customers, as well as to the reading public, and might assure the readers that the pharmacist is a man of more or less prestige, socially or politically—that he is more versatile than would be indicated by his rapidity in filling capsules or making medicinal compounds. Not infrequently he may be honored by a college, or by a city, state or national organization, and, in that case, there should certainly be a news item, with headlines. Local and state organization meetings, banquets, *et al.*, should receive notice, as also outstanding articles by pharmacists that seem worthy of credit. The public should know about druggists, and should realize the qualities of those men whom they meet so impersonally every day. And I wish to state at this time that the newspaper will *not* know about you unless you yourself give the item. Most of us think the other fellow will take of publicity, but that other fellow is waiting for some one else to write the item or call the paper, and so a fine opportunity for favorable notice is lost. We have so much temerity in other respects that it seems almost incredible for us to be diffident in the matter of talking about ourselves to newspapermen, and it is this very excess of modesty that prevents us from having our names and our accomplishments before the eyes of the people who read.

At this point I wish to insert a plea to all men in the profession, urging them to write for pharmaceutical journals. There are scores of fine trade magazines in the states, with hundreds of thousands of readers. In a few cases, the editors may seek manuscripts, but they are eager to receive papers on any new or original ideas that you may have. It is a little old-fashioned to subscribe to the theory that if a man built a better mouse trap than his neighbor, the world would beat a track to his door. Nowadays that same mouse trap would require a full-page advertisement in the *Saturday Evening Post*, and two half hours a week on the National Broadcasting Company, with Rudy Vallee, Eddie Cantor, Burns and Allen, and Graham McNamee touting its superiority over all other mouse traps in the field. And so to-day we must rely upon our own initiative; if you have an idea for an article, don't wait for the editor to ask you for it—send it off to him at once before some one else writes, and receives credit for, the same story; nowadays editors aren't beating tracks to any one's door, possibly because they haven't any mice in the larder.

To return to the newspapers—one of the most important and widely read sections of the paper is the one devoted to human interest stories. Sometimes these are feature stories, while in other publications they are listed under news items. I refer to such articles as those describing a druggist, who, during the economic cataclysm, filled many prescriptions for the poor, and charged them nothing; the druggist who saved a life by administering the proper antidote; the druggist who

is interested in athletics and has donated a silver cup to the athletic association of the local high school; to the one who has prevented a suicide; to the one who has rushed an emergency case to the hospital in his own car; to the one who, for many years, has been quietly aiding families in need of charity. These human interest stories are occurring every day, but they do not reach the newspapers because the "other fellow" has forgotten. It is said that "names make the news;" pharmacists have good names, and make splendid material for copy, but an inherent modesty prevents them from notifying a paper.

At this point you are saying, "We have a publicity committee that takes care of our news items; why should we take the time to call up a newspaper office, or to visit a city editor, or to write an article and send it to a paper?" I will omit the axion for adolescents, "If you wish a thing well done, you must do it yourself," and quote a sentence written by Francis Bacon in 1600, over three hundred years ago: "I hold that every man is a debtor to his profession, from which as men do, of course, seek to receive countenance and profit, so ought they of duty to endeavor by way of amends to be a help and ornament thereunto." If every pharmacist in the United States were willing to be a help and ornament to his profession; if every pharmacist even once a year sent an article to the paper, or to the chairman of the publicity committee, the accumulation of favorable publicity would be far-reaching. It is the dilatory leaving of news to some one else that is so fatal to our aims.

Naturally, men not conversant with what is quaintly termed the "newspaper game" may be affronted at the occasional refusal, by a city editor or reporter, to accept an article submitted. We should remember that in the highly trained mind of the newspaperman there is a sharply defined line of demarcation between a news item and a bit of commercial advertising. Surely we know that a newspaper is kept alive by its advertising, and that advertising should be paid for. The managing editor of the *New Haven Register* said to me not long ago, when, as a matter of fact, I was seeking some publicity for the Connecticut druggists, "Druggists would resent having anyone come into the store, take merchandise from the shelves and walk off without paying for it, wouldn't they? Well, the pharmacist sells drugs and chemicals, and the newspapers sell space, and in both cases, legitimate service ought to be paid for." I quote that to lead up to the difference between *News* and *Advertising.* Advance notice of a banquet is *News*, a one-cent sale is *Advertising;* election to a civic office is *News*, advance notice of a sale of Christmas cards is *Advertising;* prevention of a suicide is *News*, the opening of a new store is *Advertising.* In the last analysis, I suppose we cannot hope to get something for nothing; my great personal hope is that we may get something for something. In some newspapers, publicity is gladly given, and even sought, for those pharmacists who have a daily advertisement in that paper. In others, any attempt to "steal" space is frowned upon. In the small town, the druggist may be his own press agent, and should know and respect the judgment of the men who conduct the papers; but he should frequently submit news about himself and his store. In the larger cities there is an almost insurmountable obstacle because of the wide variation of interests there; a reporter doesn't have to walk from house to house looking for something to happen in Los Angeles, Chicago or New York, and he may be loath to publicize the accomplishments of a mere druggist. How-

ever, the grade A papers of the country have, for the past five years, shown a tendency to minimize the glaring and sordid stories of murder, crime and sex, and to give more space to scientific news; that is, they wish to be social, rather than anti-social. This fact is in the pharmacists' favor.

I seem to be taking a most circuitous route in order to accomplish the end for which this paper was written. Most of you are probably asking, "So what?" as I reach the point, as you think I have said nothing which you did not previously know. It is axiomatically simple to be destructive in criticism, and gigantically difficult to offer, in this the Era of Codes, some constructive ideas which are workable and practicable. In outline form, the ones I should like to suggest are:

1. Favorable publicity is as essential for a successful pharmacist as national advertising is for the products he sells.

2. Newspapermen are always looking for news, and if you, or one of your fellow pharmacists, have done anything worthy of note, the local paper will be glad to print the item, but you should not wait for some one else to notify the press.

3. Unfavorable publicity cannot be curbed. "The evil that men do lives after them; the good is oft interr'd with their bones." Druggists are human, after all, and will, therefore, continue to furnish fodder for the rocking chair brigade. But these unfavorable articles may be offset by a great number of favorable ones.

4. Send articles to your favorite pharmaceutical journals. These may not necessarily be of interest to the public, but they will be of interest and benefit to your fellow workers.

5. Every life, no matter how relatively simple, is a story; you, as pharmacists, have on your threshold the material for innumerable stories, if you choose to think of yourself as interpreter or motivating force; if you realize what an important entity you are in the great game of life.

6. In the large cities, there should be an active publicity committee, a sort of central clearing house, the chief agent of which might be a man who understands the drug business, and also knows advertising and newspaper work. There, with a unit effort toward combating the chain, toward high grade, expert service of a high standard, the committee, with this thought in mind, should be held responsible for the actual publication of favorable articles. I do not mean stealing space, but the writing of items of real interest to the readers, and not alone of personal benefit to the individual druggist. Every druggist should get in touch with this agent, who might serve as a liason officer between the pharmacists and the newspapers.

7. Names make the news. Determine to have your name, or your store or your profession, make some fine news as quickly as possible. May I suggest as a motto for the 1933–1934 pharmacist the following—

"What rage for fame attends both great and small!
Better be damned than not mentioned at all."

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

"The following paper by Dr. Edward Kremers entitled, 'Introductory Lecture to a Course in History of Pharmacy,' was presented at the Madison meeting of the American Association of Colleges of Pharmacy. Its importance from the standpoint of history was at once recognized and the Association voted that the paper should be printed in this Section of the JOURNAL OF THE A. PH. A. in order to give a wider distribution. It is with great pleasure that the Editor presents this historical material by Dr. Kremers."—C. B. JORDAN, *Editor*.

INTRODUCTORY LECTURE TO A COURSE IN HISTORY OF PHARMACY.

BY EDWARD KREMERS, UNIVERSITY OF WISCONSIN.

Frequently I have been asked to write a history of pharmacy. Quite aside of personal limitations and the want of necessary leisure, it has seemed to me that we are not prepared to write a history. What we are sadly in need of is detail work which may serve as building material for a future historian. True we have several valuable treatises that either style themselves history or are regarded as such. Even the ponderous tome of Schelenz, a valuable reference work because of the twenty-five thousand primes in its index, is not a history in the true sense. History is not a chronicle of events arranged according to centuries, any more than science is a collection of facts, no matter how well arranged.

Having refused again and again to attempt to write a history of pharmacy, I was happy to respond to a request made by the Chairman of our Executive Committee to read a paper on the "Teaching of the History of Pharmacy," moreover to present such a paper here in Madison where it might be supplemented with illustrative material. Even before the request came to me, I had jotted down certain ideas which, it seemed, might serve as an introductory lecture to a course on the History of Pharmacy. These notes I have supplemented for this occasion with the briefest possible outline of a year's course. If after having presented to you this subject you are sufficiently interested therein to want to know about particular details I shall be happy indeed to discuss these with you, either individually or collectively, using the material here exhibited for the purpose of illustration. The student of history of medicine is apt to regard pharmacy as an offshoot of the practice of medicine. Indeed, there are representatives of the calling to-day who look upon it as one of the many specialized departments of medicine. On one occasion, LaWall appears to have taken satisfaction in telling the physicians of Philadelphia that pharmacy came first, hence medicine developed out of it. Friendly rivalry may be tolerated even in history, but the serious discussion concerning the priority of medicine over pharmacy, or vice versa, seems to be about as futile as the quarrel which was first, the hen or the egg. The fact is that history teaches us that both had a common origin, *viz.*, in the animal instincts of primitive man.

Wild animals to-day bathe their wounds in water or cover them with a layer of

mud. Domesticated dogs lick their wounds, other animals relieve internal disorders by fasting. The "Heilinstinkt" manifests itself in a variety of ways. When Kristin, the daughter of Lavrans, is described by Sigrid Undset as licking the pus that prevents her infant from opening his eyes, she practices that animal instinct referred to. As hunter and warrior, primitive man bore most of the wounds, but it was primitive woman, as wife and mother, who acted as nurse to her husband and child.

Wounds, also skin affections due to insects, were external and, while not always curable, did not partake of the element of the mysterious. The cause was readily apparent. The remedy, *viz.*, washing, or the application of a poultice of green leaves or comminuted fresh bark, or the application of an animal fat, was no more mysterious. It was different with internal disorders. In nature that surrounded man on all sides, he recognized evil as well as beneficent forces. They were his superiors. To the beneficent he rendered thank offerings. To the evil ones he rendered offerings of atonement, he even fought them. Nature gave him food and drink, the givers of which man personified; it also sent the destructive lightning which likewise he personified. The evil demon sent his equally evil spirits to plague man in the form of disease. Hence, disease was cured by driving out the evil spirit.

If in the first step of the development of primitive medicine and pharmacy the methods employed were natural, the second step in the development of combating disease partook of the supernatural. The original healer, in the person of wife and mother, was supplemented by a person of superior attainment, the priest and medicine man. Though appealing to the religious beliefs of the people, the new healer did not discard the earlier material practices of mankind, but extended his observations not only with regard to man's physical defects, but also with regard to the remedies which nature provided. What is more, he learned to improve on the preparation and modes of administration of these remedial agencies.

In the development of human society, both groups of healers have played important rôles and play them to this very day. Not only may we study the practices of both among primitive peoples in our own day and age, but the settling of this continent and the westward movement have demonstrated again and again the persistence of both types in more advanced, yet pioneer, society. However, it appears to have been in Greece during the height of her civilization that a separation of lay medicine from temple medicine took place. True, even in Egypt irregular practitioners had existed at least a thousand years earlier. The "Papyrus Ebers" is said to have been the formulary of such a lay practitioner, but he was irregular, hence had no social status such as that enjoyed by the priest mediciner. It was Hippocrates who, during the latter part of the fifth century and the early part of the fourth century B. C. raised independent medicine to its high standing. True, not all lay practitioners attained a social status, for not a few, even later in Rome, were Greek slaves. Yet there developed a medicine that discarded supernatural practices, and based its doings more and more on natural observations.

While this is true, it is equally true that Greek medicine was influenced profoundly by the philosophical speculations of the age. Thus, comparable to the general theory of the four elements there developed the specialized theory of the four cardinal juices of the human organism. The remedial agents, the materia medica, underwent a like classification. Both theories were perpetuated for more

than a millenium and are reflected in modified form in the theories of Paracelsus. The perfect mixture of the four humors was said to bring about eucrasia (ευ well, and κρασι to mix); their imperfect mixture dyscrasia (bad). These speculations constitute the foundation of the humoral theory favored by Vesalius and recognized by medical practice for centuries.

During this high stage of medical theory and practice, the maxim was: Nature heals, the physician assists in the healing process. The sad aspect of the situation lay, it has been said, in the fact that it did not continue indefinitely. With Galen, who transferred his activities from Greece to Rome during the second century of the Christian era, ancient medicine is said to have come to a close. To him has been attributed the statement that the physicians no longer knew the medicaments which they administered because they left the preparation thereof to others. This segregation of pharmacy from medicine had not come about over night as it were. Even in Greece special root gatherers (rhizotomoi) and cutters, preparers of medicaments (pharmacopœi) and of ointments (migmatopœi), also sellers of medicaments (pharmacopoloi) and of ointments (migmatopoloi) had appeared upon the scene. In Rome there had likewise developed herbarii and others. Because some of these drug sellers occupied the Seplasium, they were known as seplasiarii. Like the Greek slaves practicing lay medicine, they were of low social status. Unlike the occasional Greek slave who was freed because of the medical services which he had rendered, we do not read of a Greek rhizotomos or a Roman herbarius who was thus elevated.

As already pointed out, ancient medicine had passed its zenith with Galen. True, there were many medical writers of note who came after him, but medicine partook of the common downgrade of Roman civilization. The conquest of Rome by the Germanic barbarians toward the close of the fiftieth century was but an outward expression of an internal decay. The Middle Ages that followed, while spelling stagnation so far as Mediterranean civilization was concerned, meant an awakening not only of the Arabic world but also of the vast transalpine countries of Europe. Medico-pharmaceutical practice of the primitive Celts and Germans had been largely in the hands of "wise" women and priests as was the case with other primitive peoples. With the spread of Christianity, the Christian priest replaced his pagan precursor. He was the bearer, not only of scholastic learning in general, but of medico-pharmaceutical knowledge in particular. Witness the building and garden plans of St. Galls with its medicinal herb garden separate from the culinary garden. Witness also the dispensary of the monastery Muri, now a part of the Schweizerisches Landesmuseum in Zuerich. However, the change from pagan to Christian civilization was not infrequently a surface change, not a more deep-seated change of heart. Pagan practices, medico-pharmaceutical as well as religious, centered about the descendant of the "wise" woman of an earlier civilization. Naturally, these practices were combated by the Christian priest and condemned as witchcraft. A worth-while picture of this combat has been drawn for us by Scheffel in his "Ekkehard," the monk from St. Galls who, on the Swabian Howentwiel, threatens the "Waldfrau" with the stake. They differed possibly less in their medico-pharmaceutical practices and the herbs they employed than in their religious attitude: the Christian prayer of the one and the heathen prayer, called incantation, of the other.

If at the beginning of this period medico-pharmaceutical knowledge and skill as well as general scholastic learning were primarily a possession of the monks, the time came when a pope forbade medico-pharmaceutical practice by priests. That of the monks continued far beyond the middle ages into modern times. This change in church attitude may have been brought about by the introduction of Arabian medicine into Christian monasteries. An account of this we find, *e. g.*, in "How Constantine, the African, Brought the Art of Medicine to the Christians," *viz.*, from Carthage in Africa to Salerno in Italy. If Greek literature was brought to Italy and thence to countries north of the Alps after the capture of Constantinople by the Turks, when Greek scholars sought refuge for themselves and their manuscripts in Italy and elsewhere, Greek medical texts had previously been spread over northern Africa and across the Mediterranean into Italy and Spain by the Moors. Not the original Greek, it is true—in this respect the medico-pharmaceutical renaissance differed from the later rebirth of classical Greek literature—but through Syrian and Persian translations and then into Arabic. Just as in ancient Greece lay medico-pharmaceutical practice had gained for itself a social position of its own as opposed to priestly standing, so during the middle ages, medicine and likewise pharmacy acquired footholds of their own quite independently of the monasteries and convents. With it came the separation of pharmacy from medicine as foreshadowed by the public apothecary shop of Bagdad in the 9th century and as it was further developed in some of the Italian cities as reflected in the edict of Roger of Sicily, and more particularly in the edicts of Frederick II, ruler of the Holy Roman Empire of the German Nation from 1215 to 1250. Not that the separation was complete. For a long time physicians and apothecaries were members of the same guilds. Moreover, the physicians for a long time constituted the ruling branch of the professions united in the same guild and lorded it over their former confrères even after the apothecaries were permitted to have their own guild.

A new era, however, was in the dawning. The discovery of a new continent widened the geographic horizon of man and thus prepared him mentally for other changes. The revival of classical learning seemed to bridge over the chasm so often referred to as the dark ages. The discovery of the use of individual type by Gutenberg made the printing press an instrument that exerted a most profound influence on the spread of ideas. The Reformation and the Counter-reformation were but ecclesiastical manifestations of the changes that were going on, not only in the religious world, but in the world at large. Medicine and pharmacy both shared in these changes from scholasticism to the renaissance in literature, art and the sciences.

The year in which the first voyagers to the West Indies returned witnessed the birth of one who was to exert a most profound influence on medicine and pharmacy as well as on chemistry. Theophrastus von Hohenheim, known to the scientific and literary world as Paracelsus, became the representative of the Nordic renaissance. The revival of classical Greek medicine *via* the Arabic school had prepared the way. Yet it was he who broke away from the Greek concepts of the crasia and humoral pathology. Nature, in and by the large, he regarded as the macrocosm, of which man, the microcosm, was a part and in whom the macrocosm was reflected.

In the place of the four so-called Aristotelian elements he accepted the three

commonly known as the Paracelsian elements, *viz.*, sulphur, mercury and salt. As all chemical processes in nature are represented by sublimation, combustion and incineration, so the processes of the human body. Yet, strange as it may seem, the distinctly chemical processes of digestion Paracelsus attributed to archæus, an incomprehensible something, a sort of spirit. He is also supposed to be responsible for generation and reproduction.

Just as Greek medicine regarded the normal human body as an equilibrium of the four humors, so Paracelsus looked upon the healthy human body as a proper combination of the three elements. Again, as the Greek physician corrected the defect by administration of a drug representing the defective humor, so Paracelsus corrected any defect in the deficient element by a medicament rich in that element.

Thus it came about that changes resulted in the materia medica. Indeed, Paracelsus preached that it was the duty of the chemist to produce medicaments rather than to transmute baser metals into nobler ones. Not that he did not believe in transmutation. Indeed he believed, after a fashion, in the four ancient elements as well as in the modern three. Thus it came about that mineral medicaments, which had been restricted for the most part to external application, were now recommended for internal use. This was revolutionary and resulted in a century-long feud between Galenist and Paracelsist.

By the time that Paracelsus began to teach his new doctrines, the exploration of America had made the old world acquainted with a number of new drugs first described by Monardes. Moreover, the discovery of the all water route to the East Indies had greatly cheapened oriental drugs (spices and aromatics) and had made them available to ordinary medical and pharmaceutical practice. Not only that, new processes looking toward the extraction of the quintessence of these drugs were introduced. As a matter of fact, such preparations as tinctures and extracts, aromatic spirits and waters, now commonly referred to as galenicals, were introduced by Paracelsus and his followers. Extraction and distillation were regarded as distinctively chemical processes.

If the physician's medical armamentarium was greatly enriched by pharmacognostical as well as chemical additions, the apothecaries' activities were equally enlarged. Just as the physician was rapidly outgrowing his diagnostical symbol, the urinal, so the apothecary outgrew, as it were, his mortar and pestle, the symbol of his art. With this change we enter upon that phase of modern pharmacy during which the apothecary shop became the cradle in which were rocked the infant sciences of chemistry and botany.

If thus we have hastily sketched some of the phases of development of the art and science of pharmacy, it does not follow by any means, that, with the ease of the spread of knowledge, made possible by the development of the art of printing with individual type, the progress of pharmacy in the several European countries was uniform. The subsequent development of the calling of the pharmacist depended as much upon political, social and economic conditions as upon the further development of the underlying sciences. Thus, whereas the status of chemistry, at the beginning of the nineteenth century, was much the same in England, France and Germany, the status of the apothecary in these countries differed greatly.

When we turn to the study of the development of pharmacy in the several countries, it seems reasonable to classify the history of pharmacy into ancient,

medieval and modern as does general history, for as already pointed out, the history of pharmacy reflects, not only the status of the underlying sciences, but the political, social and economic conditions of the respective countries as well.

Even if the time available for the study of the history of pharmacy were much greater than it is apt to be, it would be unwise to attempt to outline the development of pharmacy in all countries of antiquity. It may be well to restrict ourselves to Egypt on the one hand and Greece and Rome on the other.

So far as the middle ages are concerned, an outline of the development of Arabic pharmacy should suffice. Christian medieval pharmaceutical development may be touched upon later in connection with the several countries to receive consideration.

As to the modern period, no useful purpose will be served by attempting ever so brief a review of all European countries. The countries selected should represent as many special phases of pharmaceutical development at large.

A beginning may well be made with Italy from which the renaissance spread to the transalpine countries. Florence issued the first city-state pharmacopœia in 1498. Hence the study of the bible of the apothecary may be emphasized.

In connection with France, the development of guilds, first together with physicians and spicers, later independently, and finally the change from guild to college just before the outbreak of the French Revolution should receive special attention.

Germany next affords an opportunity to study the practice of pharmacy under direct state control: the concession, both personal and real.

Finally, England is a good example of laissez-faire and all that this implies.

While these fundamental phases of pharmaceutical development are emphasized, it does not follow by any means that other aspects of pharmaceutical history should be neglected. However, the mere memorizing of dates and names should not be indulged in. Moreover, while it seems expedient to stress the development of the official pharmacopœia in connection with Italy, that of the growth of guilds with France, etc., it should not for a moment be assumed that these phases of pharmaceutical development are necessarily peculiar to the countries mentioned.

Possibly one of the best educational methods to bring in the innumerable accessories, as it were, is to make use of the lantern slide. Pictures of men, of apothecary shops, of laboratories, of drugs, of the hundred and one other phases of the practice of pharmacy may thus be brought to the attention of the student.

While the lantern slide talk may well serve the purpose of stimulating a general interest, it should not be regarded as an equivalent of home study. For this purpose the topic may be used to advantage. It will not only supply the necessary substance, but it will enable the instructor to induce the student to acquaint himself, in a measure at least, with the literature on the history of pharmacy. In order to do this, the instructor will have to collect for years the material that has become available. Mere reference to one or the other of our so-called histories of pharmacy will scarcely be satisfactory.

Having thus reviewed, though ever so briefly, the development of modern European pharmacy during the first semester, the second semester may be devoted to a somewhat more detailed study of the development of American pharmacy. New Spain, New France, New England, New Netherlands and even New Sweden

afford opportunities to study the contributions which these countries have made to American pharmacy, also what contributions to American materia medica their exploring representatives carried back to Europe.

The Revolutionary War affords an opportunity to touch upon the army hospital apothecary, an institution imported from England, not from the European continent.

With the period of reconstruction after the Revolution, there begins that westward movement of the frontier, each wave of which saw revived the frontier conditions in which the wife and mother was the family healer, the missionary not only a healer of the soul but of the body as well, in which the drug store scene described by Cooper in "The Pioneers" was reënacted again and again.

While history repeated itself on the frontier, it also repeated itself, though in modified form because of modified conditions, in the more settled states along the Atlantic seaboard. The organization of the College of Apothecaries in Philadelphia in 1821, changed after a year to a College of Pharmacy, reflects the changes in French organization from guild of apothecaries to college de pharmacie of a generation previous. The P. C. P. was not, as now commonly considered, an educational institution, but a closed corporation which, it is true, conducted an evening school for the apprentices of its members, as it maintained a library, a museum and, somewhat later, a journal.

The influx of German apothecaries before and after forty-eight not only brought a better educated type of apothecaries to this country, but with them the idea of state control. State control in turn was preceded by the organization of state associations, a movement stimulated by the AMERICAN PHARMACEUTICAL ASSOCIATION which had been organized in 1852. State legislation, which followed state organization, paved the way to our present status. While the state boards kept out those completely incompetent, their low educational standards are, no doubt, responsible for the present unsatisfactory conditions as to rank and file.

Having referred to present economic conditions, it may be well to indicate the turning point between the old and the new. If in King Phillip's War the medicine chest of Surgeon Locke proved inadequate, the Revolutionary War demonstrated still more strikingly the inadequacy of the drug store as a provider of medicaments for large bodies of men. However, it remained for the Civil War to set into motion the wheels of pharmaceutical industry, at least in the North. This development against which the retail druggist fought unsuccessfully for a generation, changed the economic foundation of pharmacy and with it commercial practice. Whether the socialization of all health institutes will once more revolutionize the American drug store remains to be seen.

Thus one phase after another of American pharmaceutical development may be taken up with antecedent European conditions as starting point. Whatever the contributions of the several European countries, American pharmacy of to-day is not merely a blend of European donations, but, in its finality, largely a product of American soil.

In closing this all too sketchy outline permit me to end, as I began, with a plea. Do not make a course in the history of pharmacy a cram of dates and names. That is easy but scarcely satisfactory. It will be more difficult to instil into the

student's mind some of the spirit of pharmaceutical history. No matter how little you accomplish in this direction, it will at least be worth while.

DISCUSSION.

Dr. Edward Kremers: Before you inspect the material that has been arranged here for demonstration purposes, I want to say just a word or two by way of specific illustration.

First of all, I should say that we have not a collection but a selection. Professor Miller, a medical colleague of mine, once became rather incensed when his collection was referred to as a collection. He said, "it is not a collection; it is a selection." This selection is not even a select selection. We have brought here a few things that might show those who want to teach the history of pharmacy what is available, and that even an advertisement may sometimes serve a useful purpose.

I should like to use two special illustrations, however, to make my point. Some of you may remember Elbert Hubbard who wrote a lot of biographies of poets, sculptors, men of science and what not. In writing of Dante he says: "Just what his every-day occupation was we are not sure, but as it was he clerked in a drug store and often expressed himself thus: 'Lady, I am all out of liverwort to-day, but I have here something just as good.'

"And he read her a few stanzas from the *Vita Nuova* that he had just written behind the screen at the prescription counter."

Elbert Hubbard used his imagination a good deal in writing a biography. Some of our pharmaceutical biographers do the same, though.

Florence had a guild, not only one guild but at the time of Dante had twenty-one guilds representing some seventy or eighty callings. These different callings were organized into twenty-one guilds for political and military reasons, and in order that a citizen might exercise his franchise he had to be a member of a guild, for it was through the representative of the guild on the common council, as we should say, that he could exercise his franchise, and in no other way.

Dante was not an apothecary. He was a member of the guild of physicians, speziali (apothecaries) and merchants, and inasmuch as the painters and the dealers in paints were a part of that guild he evidently found congenial souls therein.

I mentioned the fact that Florence was the first to have a pharmacopœia in the modern sense. Why should it be that Florence should be the first to have a pharmacopœia? Why not, for instance, Venice or Genoa, the drug-dealing merchant cities? Florence is right here (indicating on a map) just below the Lombardy Plains. The reason, however, is evidently very apparent if we stop to consider, for instance, that the Saint Gothard Pass, the Engadin Pass, and so on, lead the roads through Florence on the way to Rome, and all roads that led to Rome had to lead through Florence. Florence, therefore, became the city of the crusaders on their way to the East, and the way of the returning crusader invalids after they had stopped at Salerno, and so on.

If you will stop to look at this valley of the Po, it is up here that in Florence, Mantua, Verona and Bergamo the first four city-state pharmacopœias were developed in this industrial and agriculturally rich center of the Lombardy Plains. Rome came later. Venice and Genoa came much later. Naples came much later. The seaports were by no means the first. It was because of the active life of which the Medici were the sponsors. The Medici, from "medicus," physician, were originally said to have been apothecaries, and the three pills in their coat of arms indicate their apothecary origin. They afterward became bankers, and the pills degenerated ultimately into the three plates of the sign of our American pawn shops.

I just want to point out the importance of the background. Why should Florence have the first pharmacopœia? The pharmacopœia doesn't answer that question. You have to go back of that.

I have mentioned that the person who wants to teach the history of pharmacy will first have to be a collector. I have here a little book (I don't know whether there is another copy of it here in the U. S.; there may be one in the Congressional Library, but I am not sure) which I looked for, for thirty years. One day I found a copy announced in an antiquarian catalog, and I asked our librarian to order it. Unfortunately, I fear, he procrastinated and we did not get that copy of the book. As luck would have it, within a year I saw another copy announced, only $300. I told our librarian about it. "Well," I said, "I have been looking for that book for thirty years, and $10 a year for thirty years isn't too much for it."

It is the first treatise on American materia medica written by Monardes, a Spanish physician of Cadiz, the port of entry of the two Indies, East and West. All of the ships that returned from the two Indies had to report there, and Monardes collected from the surgeons and sailors and anybody else who collected drugs all the material he could get and thus established the first drug cabinet, and wrote the first treatise on American materia medica. That book was early translated into every language of all seafaring people: French, English, Dutch and Italian. It was also translated into Latin, the scientific language of that time. The Germans were the last. It was translated the year before our World's Columbian Exposition commemorating the four hundredth anniversary of the discovery of America.

Just a single instance of how a drug may be interesting and reflect not only medico-pharmaceutical history, but economic history as well. In our historical library we have the Jesuit Relations, seventy volumes edited by the former superintendent of the Society, Reuben G. Thwaites. Fortunately, he supplied a two-volume index to those seventy volumes, so it became possible for us to glean a few pharmaceutical facts. We learn from one of the Relations by Father Jartoux, who was in Manchuria at the time, how the ginseng was collected for the Chinese emperor. He wrote about it in his story to the headquarters at Paris. Paris sent out copies to the other Jesuits, hence a copy came to Canada presumably, because Jartoux pointed out that he thought the woods of Manchuria resembled those of Canada, and that possibly the ginseng might be found over there.

It was Father Lafitau who was stationed not far from Montreal, and having read this Relation from his confrère in way-off Manchuria he went out into the woods to look for ginseng. He almost despaired finding it. Finally, he did find it, and here we have his illustration of the plant and his story of it. The book was dedicated to that roué, the brother of Louis XIV, the Prince of Orleans. He went with that drug to an Indian squaw and wanted to know what they called it. She said, "garentongen."

He said, "What is the meaning of "garentongen?"

"Man root." Ginseng in Chinese also means man root. We have here an illustration of why ginseng is a panacea. The liverwort is good for the liver because the leaf of the liverwort resembles the human liver. According to the doctrine of signatures, God has providentially not only cursed us with disease but also has provided us with remedies to cure those diseases if we but open our eyes to his creations. So the ginseng, having the shape of a man, you see, represented not only an organ or an extremity but resembled the whole body, and therefore was the panacea for all troubles of mankind.

No sooner had Father Lafitau discovered the ginseng when they began to collect ginseng, and the Indians were among the first to collect it. Here we have our first strike, possibly in New France. The Indians, instead of working for the settlers, refused to do the heavy agricultural work and preferred to collect ginseng and sell that to the merchants in town. So the farmers of New France greatly resented this new discovery.

You have heard of the French and Indian wars. Those French and Indian wars were conducted in part for the furs which, on the one hand, the French bought from the Indians, and on the other hand, the English settlers bought from the Indians. The ginseng also played a rôle with us. After fur hunting ceased in the Kickapoo Valley, ginseng hunting began, and the squatter and the settler, when he wanted some powder and shot and a bottle of whisky, would go out to hunt ginseng and take it to the store and trade it in for what he wanted more than ginseng.

More than that, after the Revolutionary War, when our thirteen original states tried to recover from the first depression, they found that they had little money, if any, but they had ginseng. An economist of that period points out that it was the good fortune of the citizens of the early U. S. that they could send a ship load of ginseng to China and exchange it for silk and tea, extravagances in which some of them cared to indulge. I might add, finally, that ginseng was one of the two items of trade which was valuable enough to be able to afford the wagon freight from Kentucky over the Alleghenies to the Atlantic seaboard.

Here I have given you just two illustrations, and if any of you are interested I shall be glad to visit here with you and talk over others, but I must not detain you any longer. I shall be glad to answer any questions, as I said before, either individually or collectively, as you may see fit.

If any of you want to teach the history of pharmacy (and several of you have spoken to me about it), the first thing you ought to do is to become a member of two societies, or have your libraries subscribe if you can't afford in these days of depression to become members of the two

societies. One is the Société d'Histoire de la Pharmacie which publishes Revue de l'Histoire de la Pharmacie. Here are the original bulletins published.

Then the second organization which you should join is the Gesellschaft fuer Geschichte der Pharmazie which publishes its "Abhandlungen." It has been my practice to subscribe for not only one copy but two or three. One copy I file away as the proceedings of the organization. The other two copies I use to tear up and file the articles and illustrations with the different chapters.

Finally, I have two articles, one by Herman Schelenz, the author of the "Geschichte der Pharmazie"—"The Use and Necessity of Teaching History of Pharmacy," and the other by Georg Urdang, the founder of the Gesellschaft fuer Geschichte der Pharmazie on "Wesen und Bedeutung der Geschichte der Pharmazie."

I have here a few library cards which are not up-to-date (they were published in 1921) which will tell you about the literature on history of pharmacy in general, and then give you a brief outline of the individual treatises and references to reviews so that you can get the opinion not only of the author and of the person who wrote the card, but of the reviewers of that time as well.

SYMPOSIUM ON PRACTICING PROFESSIONAL PHARMACY.*

The Foundations of Success for Professional Pharmacy.

BY E. FULLERTON COOK.

The promotion of professional pharmacy is very dear to the hearts of many who sit in this room, and yet as I go about I find that many pharmacists in this country are greatly disturbed because they say they have little opportunity to really practice pharmacy. Some will say to me, "Our colleges are now offering four years of scientific training for professional pharmacy. Why are they doing it? In my pharmacy I have little need for this training."

Fortunately, there are some who have faith and a vision, and are practicing professional pharmacy in such a magnificent way that there is encouragement, as never before in my experience, in the possibilities of professional pharmacy.

We have had brought to our attention in a most spectacular fashion by two groups in the last year the importance of pharmacy in the United States. The Committee on the Costs of Medical Care has brought to our attention a report which shows that there are used in the United States something between $600,000,000 and $700,000,000 worth of drugs and, to the astonishment of most of us in pharmacy, eighty-seven per cent is sold through retail drug stores in the United States. I don't believe those facts have come effectively to the attention of the practicing pharmacists of the United States. In support of that, along come the remarkable figures of the Department of the Census of the United States Government just published. They report approximately $600,000,000 worth of drugs sold in the United States, of which ninety-five per cent is sold in drug stores; through department stores, one and one-tenth; through cosmetic and toilet stores, two and one-tenth per cent; through general country stores one and two-tenths per cent; through general merchandising stores, one-tenth of one per cent; through mail order houses three-tenths of a per cent. Such figures indicate the importance of medicine and medical sales in retail drug stores of the United States.

What I am trying to bring to your attention is the possibility of success through strictly professional activity in retail pharmacies, the departments that in the large chain stores have been a small factor. May I make it perfectly clear now, and without any misunderstanding, that I am not saying there cannot be a large chain store or a large commercial pharmacy with a splendid professional pharmacy department. George B. Evans in Philadelphia demonstrated that it could be done. The physicians of Philadelphia had great confidence in his professional departments and in the ability of his pharmacists, and the quality of his medicines was well known.

Ordinarily, there are chiefly three general outlets for this very high type of professional service of pharmacy at present. One is in the hospitals, where there is great opportunity for

---

* See page 1021, October JOURNAL, and page 1196, November issue. It is hoped to complete the papers, not printed here, in another issue of the JOURNAL.

professional pharmacy to be practiced with splendid coöperation from the medical staff. It is now being done most effectively in many places. *Secondly*, in those professional pharmacies associated with groups of physicians in medical centers, a highly professional type of service, with physicians coöperating with the pharmacy and receiving superior pharmaceutical scientific aid. In smaller communities there is also the opportunity for the pharmacist to-day to have a well-developed professional department, where professional dignity and skilled service are possible. This pharmacist may have on the side, in another department of that same store, the other things which the community demands, such as soaps, brushes, cosmetics, perfumes, candy, stationery, cigars and probably a soda fountain. I admit I have no sympathy with the lunch counter when it is part of the drug store. If it is a division of a department store, and the professional department is separated as a specialized professional division, it is acceptable. At least I see no objection. Unless there is the correct atmosphere and a trained and cultured pharmacist in charge, there is no opportunity for this type of professional service.

I recently heard a sermon in which the text was: "Whatever ye shall ask in faith, believing, it shall be granted unto you." The minister said something like this: "Suppose there is a banker and he needs $500,000. He gets down on his knees and prays the Lord to bring him $500,000. The Lord turns to one of his angels and says, 'Look this fellow up and see whether he deserves this money.' The angel comes down to earth and investigates the man and comes back and reports, 'Yes, he is all right. He has credit, he has integrity, he has friends.' The Lord says, 'All right, let him have the $500,000.' And because the man had lived the qualities which justified the credit, he gets the money."

That is exactly this situation here, as I see it. This fellow says, "I want to have a fine professional business." He can pray to heaven for it, and the angel comes down and looks him over. What qualities must he have? He has to be a cultured gentleman who can be at ease when he talks to his medical friends. They must have mutual relationships and mutual friendships, and meet socially. That is why we are giving four years of general and scientific college training to the pharmacists of to-day. It is a tremendous asset. The technical training is essential, and the ability to talk the doctor's language. The pharmacist must know much about modern therapeutic agents and about the Pharmacopœia and the National Formulary, and be prepared to supply technical information.

I know a pharmacy where physicians are calling up many times a day, and coming in. Yesterday I had the privilege of going into a relatively small professional pharmacy here in Madison. While I was there several doctors came in for information. The pharmacist said, "This is a regular part of our duty. The doctors in this building come into the pharmacy, and we give them every possible help."

I know of two skilled pharmacists conducting three special pharmacies within two squares in a large city. One physician came in and asked for help on a certain dermatologic preparation, and they conducted over one hundred experiments without cost to the physician. Not only did they win the favor of that physician, but he told his friends, resulting in many new opportunities. Their great success is evidence of the need for such professional pharmaceutical service to practicing physicians. These retail pharmacists believed in themselves and were prepared to give this type of splendid service.

A third necessity for a professional pharmacist is good equipment and a laboratory where he can be proud to meet physicians and impress the public. I advocate a prescription department open to the public. There is no better means of advertising. Let the manufacturing be seen by the public, also. You should be proud of your equipment and also your library. How can a technical service be rendered without a competent and adequate library?

If you believe in pharmacy, believe in yourself and work with the physician and believe in him, there is a great opportunity to-day. It is being demonstrated in many places.

The slogan for your pharmacy should be: "We coöperate whole-heartedly with the physicians of our community in the interest of public health."

Individuality and responsibility have a value in establishing the standing of the pharmacist in professional activities. Pharmacy is known by its service, the pharmacist by his personality and devotion to pharmaceutical duties.

The Hospital Formulary.

BY ROBERT A. HATCHER AND WENDELL J. STAINSBY.*

Large hospitals find it necessary to limit the prescriptions of the staff mainly to selected formulas, and this system has tended to promote the use of proprietary formulas which usually cost much more than their official equivalents without corresponding advantage. The physicians of the staff do not often come in contact with the purchasing department or with the pharmacy of the hospital, but they are frequently interviewed by the representatives of pharmaceutical manufacturers who persuade them that their preparations have marked advantages over the pharmacopœial.

The Formulary of the New York Hospital was prepared by a committee which invited representatives of every department to present formulas desired for their departments. In every case where a complex formula, or a proprietary preparation was desired the advocate of it was requested to present evidence of its superiority over the equivalent official preparation, and unless such evidence was submitted the committee declined to admit the article, or, in a few cases, admitted it with the proviso that it would be deleted unless evidence was presented that would justify its retention in a subsequent edition of the Formulary.

The Committee adopted the following rules governing the admission of articles to the Formulary.

Rule I.—Simple official (Pharmacopœial) substances will be admitted [when requested] unless they have become superfluous.

Rule II.—No article will be admitted (except for controlled research) before its therapeutic value has been established.

Rule III.—No article of secret composition will be admitted.

Rule IV.—No article which is sold under a proprietary name will be admitted under such a name if a substance of identical composition can be obtained under a non-proprietary name.

Rule V.—No mixture of two or more active substances will be admitted unless evidence is submitted that the mixture presents therapeutic advantages over the simple substances.

Rule VI.—No proprietary article will be accepted before it has been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in "New and Nonofficial Remedies."

Rule VII.—Requests for articles not included in the Formulary of the Hospital, but which are desired for use in controlled research which has been approved by the head of the department in which the investigation is to be conducted, will receive consideration by the Committee.

Rule VIII.—It is the policy of the Committee to discourage the intravenous and intramuscular injection of substances which should be administered orally.

A careful examination of these rules will convince one that no article which is essential to the treatment of the sick is excluded from the Formulary. For example, insulin was admitted without question, because there is no pharmacopœial substitute. On the other hand, mere popularity was not accepted as evidence of value.

In a few cases members of the staff were so firmly convinced of the superiority of a proprietary preparation that a blind test was proposed. In one such case, each of several departments was supplied with capsules containing the official barbital, and the therapeutic equivalent of a proprietary barbital derivative. These were labeled either A or B for the smaller dosage, and C or D for the larger, with the statement that the capsules contained either barbital or the derivative in question. This investigation has not yet been completed, but it is intended to analyze carefully the results of the reports of the several departments of the Hospital, in order to determine whether the evidence supports the contention of the advocate of the proprietary article. If the evidence does show that it is superior to barbital it will be admitted to the Formulary. It is intended to pursue a similar policy in every case, so far as it is possible, so that no member of the staff can have any reason to feel that he is deprived of any drug which he considers essential, but he must furnish satisfactory evidence, in the form of reports of his own investigations or from the literature.

One member of the staff was so insistent on the superiority of a proprietary preparation

* New York Hospital, Cornell University Medical College, New York City.

of theobromine over the official preparations that one of us has conducted a pharmacologic study of the problem involving probably about 200 experiments. While the results of these experiments are not conclusive, they do not afford any evidence that the proprietary preparation has any advantage over the official Theobromine Sodio-Salicylate. However, they do tend to throw light on the value of these preparations for the relief of cardiac pain in certain conditions.

As indicated in the rules, this does not interfere with the therapeutic study of any proprietary preparation, nor does it prevent the use in any department of the Hospital of any substance, concerning the superiority of which the staff is so firmly convinced that it is willing to conduct a scientific study of its uses, or to provide it at departmental expense. Since the publications of the Formulary, the Committee has continued to pass on the acceptability of various formulas and articles requested by the staff.

The Committee could not have carried out its plans without the whole-hearted coöperation of the staff, and, with very few exceptions, the rulings of the Committee have been accepted without protest after the whole subject had been discussed in considerable detail.

It is hardly necessary to state that the use of the Formulary has resulted in marked economy, but it is too early to determine the precise amount saved to the Hospital. However, we are mainly interested in a system of rational therapeutics, and we believe that the use of official preparations is far more conducive to rational therapeutics than is the use of secret or semi-secret preparations, or of a great variety of preparations having nearly similar effects, and differing only in dosage.

It is hardly necessary to state that this plan requires for its fullest success a highly skilled pharmaceutical staff capable of coöperating with the medical staff of the hospital in the conduct of therapeutic research. The training of men to fill the pharmaceutical positions in such progressive hospitals constitutes at once an opportunity, and a challenge to the schools of pharmacy, for there are few such pharmacists now available.

Pharmacology in the Medical Curriculum and the United States Pharmacopœia.*

BY JOHN C. KRANTZ, JR.

The rise of organic chemistry during the latter half of the past century, and the ever-increasing number of plant principles which were isolated, created an urgent demand for an adequate trial of these substances as therapeutic agents. To meet this emergency the science of pharmacology was created. It is a fundamental science, a combination of biological and physical science, a science that bridged the chasm between the maker and the prescriber of medicines, a science so comprehensive that to-day it touches all of the ramifications of medical practice.

In America the science of pharmacology had its beginning with the appointment of John J. Abel as professor of pharmacology in the Johns Hopkins University in 1892. The far-reaching influence of Abel's appointment is evidenced by the fact that many of the chairs of pharmacology in the leading universities in this country are occupied by his pupils. Since this time there has been a steady and definite trend in medical education away from Materia Medica as an empirical, didactic course to modern pharmacology an experimental science. In the medical curricula to-day, generally in the second year of study, there is a major course designated as pharmacology.

Generally the department of pharmacology of the medical faculty embraces, besides pharmacodynamics and pharmacotherapeutics, elementary materia medica, toxicology, posology, prescription writing and pharmacy. Prior to this period, in the training of the medical student, he has not come in contact with drugs or medicines and in this course the entire scope of medical pharmacology is to be introduced and the student prepared to intelligently use drugs in the clinical courses. It is at this point in the education of the physician that be becomes acquainted with the relationship between medicine and pharmacy and the significance of a national pharmacopœia in the field of therapeutics.

In the School of Medicine of the University of Maryland, we have approached the subject by dividing the material under the following subdivisions.

---

* Department of Pharmacology, School of Medicine, University of Maryland.

1. The Nature and Source of Drugs.
2. Preparing Drugs for Administration.
   (*a*) Pharmacy.
3. Legal Control of Drugs.
   (*a*) National Standards.
   (*b*) Food and Drugs Act.
4. Administering Drugs.
   (*a*) Prescription-Writing.
5. The General Theories of Drug-Action.
6. The Local Action of Drugs.
7. The Systemic or General Action of Drugs.

This scheme of presentation is based upon the tracing of the drug from its source to the fate of the substance in the human organism. Topics 1 to 4, inclusive, are treated in about 20 per cent of the time devoted to the subject. Topics 5 to 7, inclusive, occupy the remaining 80 per cent of the time.

Although the status of the Pharmacopœia is emphasized in an early lecture in the course, its contents are treated in practically all of the subsequent training. The student is required to prepare 8 or 10 typical pharmaceutical preparations of the Pharmacopœia. These are prescribed by him and his own prescriptions are compounded. In this manner he is brought directly in contact with the field of incompatibility and made to appreciate the rôle of the pharmacist as a compounder of drugs.

In prescribing drugs, emphasis is placed on simplicity of prescriptions. Complicated mixtures multiply the chances of failure. Our students are urged to prescribe only those drugs, the pharmacology of which is well understood. These drugs are found between the covers of the Pharmacopœia and deviation from this authority is often born of pharmacological ignorance or general gullibility.

It has been a matter of general acceptance that oftentimes dependable therapeutic agents are developed by pharmaceutical manufacturers and owing to the patents these substances could not be recognized by the Pharmacopœia. These conditions are not very frequent. It is difficult to accumulate dependable therapeutic data. It requires often years to show the merit or uselessness of a drug. Therefore for the practitioner of medicine and for his patient as well, a progressive conservatism is indeed a safe policy. Never hastily discard the old and not without pharmacological and clinical proof try the new.

Through the ever-vigilant and indefatigable efforts of Professor Cook, the policy of the new Pharmacopœia meets this medical need. The committee is slowly but progressively reaching the stage, where recognition of a drug in the Pharmacopœia is evidence of its usefulness and merit in the diseases for which it is prescribed. This is a goal which should be diligently sought.

The innovation of an active interim revision program makes nugatory the criticism so often leveled at our Pharmacopœia; namely, that it did not keep abreast of the advance of science. In therapeutics our official standard has now acquired the unique characteristic of perpetual youth.

This formidable list of remedial agents forms the basis of modern pharmacology. Those who persistently digress, prescribing products the merits of which are extolled only by one manufacturer, should heed the dictum.

"It takes a long neck observer to see the whole firmament out of one window."

The drugs of the Pharmacopœia represent those seen through a window of national scope, by critical eyes and unprejudiced minds.

(*To be continued*)

The successful promotion of pharmacy results not only from the developed capacities of its votaries, but is equally dependent upon their active coöperation. Share in the activities of your state and national associations.

THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

SECTION ON EDUCATION AND LEGISLATION.

EDITOR'S NOTE: It is necessary to defer to a succeeding issue—the publication of the minutes of *joint sessions* of the Section on Education and Legislation with the Conferences of Law Enforcement Officials and of Pharmaceutical Association Secretaries—and also the minutes of the Conference of Law Enforcement Officials.

ABSTRACT OF THE MINUTES OF THE SESSIONS HELD IN MADISON—CONTINUED FROM PAGE 1196, NOVEMBER JOURNAL.

The First Session of the Section on Education and Legislation was called to order by Chairman W. Henry Rivard, Wednesday, August 30th, at 2:25 P.M. He outlined the program and stated that if time permitted, at the end of the session, he would express some thoughts relative to education and legislation.

THE SECRETARY'S REPORT.

BY CHARLES W. BALLARD.

"Before soliciting papers for the meetings of this Section, Chairman Rivard and the Secretary agreed that it might be desirable to concentrate on a few topics which would be of interest to those attending. These topics included: a better control of the experience required for licensing, the rôle of pharmacy in hospitals, the National Pharmaceutical Syllabus, the liquor and beer situation in its relations to pharmacy. Letters requesting papers and opinions on these topics were sent early in May to nearly 200 members. The responses were not as numerous as in previous years but, as the same condition prevails in other sections, we may conclude that it is a by-product of the general economic situation and not due to lack of interest. It so happens that all of the papers received, deal with educational topics and thus pave the way for the departure from the procedure of previous years as regards the arrangement of program. Legislation affecting pharmacy has become so involved that it is probable that more satisfactory results may be had by our joining with other organizations in the legislative phase of our activities.

"I wish to express my appreciation to those who have responded to our call for papers. They are doing their share toward maintaining the usefulness of our Section, if not indeed in preserving its existence. I have been requested by the authors of several papers to read them in their absence and I will be glad to do so if time permits and the Chair so orders. While those in attendance rightfully have the first opportunity, the disposing of papers with the "read by title" phrase is not adequate recognition of the time and effort spent in their preparation.

"Secretary Kelly has suggested that this Section hold a joint conference on legislation passed, pending and proposed, with the Conferences of Law Enforcement Officials and the Pharmaceutical Association Secretaries. This conference to be held on August 31st at 8:00 P.M. has aroused considerable interest and offers a common meeting ground for the discussion of such topics from several angles.

"Needless to say that throughout the preparations for this meeting I have had the usual coöperation of Secretary Kelly and Editor Eberle. Their interest is best attested by the file of letters which have passed between us."

On motion duly seconded and carried the report was received.

The following letter to Secretary Ballard was read:

> I have just learned, to my great disappointment, that it will be impossible for me to attend the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. I had intended to present extemporaneously a talk about the new Syllabus, and hence I do not have in the short time remaining opportunity to prepare a paper for your program. This is a very keen disappointment to me as I wanted to show your section something of the mechanics, the labor and the disappointments that go into the preparation of a Syllabus.

I trust that when my paper is called for that you will be good enough to say substantially what I have just told you and to offer for me to the members an expression of disappointment and apology.

August 24. (Signed) J. G. BEARD.

Chairman Rivard appointed the following Committee on Nominations: C. Leonard O'Connell, Florin J. Amrhein, John A. J. Funk.

The Chairman declared the presentation of papers in order. The first paper entitled "An Opportunity and a Challenge to Pharmacy Educators," by Henry J. Goeckel—read by Florin J. Amrhein. Motion carried to receive the paper. (It is published in the November JOURNAL, pages 1130–1133.) (Unless otherwise stated, papers read and presented were accepted.)

A paper by A. B. Lemon, "What Constitutes Good Teaching," owing to the absence of the author, was read in abstract by the Secretary. (No discussion.)

C. W. Ballard presented a paper on "The New York State Pharmacy Syllabus." It was discussed by C. Leonard O'Connell, Rudolph Raabe, Hugo H. Schaefer, George W. Mather, W. H. Rivard, H. Evert Kendig. (Discussion will accompany the paper when published.)

Hugo H. Schaefer read a paper by Fred. B. Kilmer on "Pharmacy and Hospitals." C. W. Ballard commented on the paper.

C. Leonard O'Connell read a paper on "The Hospital Pharmacist and His or Her Duties," by Sister M. Oswalda. It was discussed by H. A. Whitney and H. Evert Kendig.

Three papers listed did not reach Secretary Ballard in time for presentation.

Secretary Ballard said that there had been considerable difficulty in securing papers for the Section. Some discussion followed relative to subjects for papers of the next meeting—hospitals and their relation to pharmacy seemed to develop interest; also the proper designation for "pharmacy" and "drug store." It is hoped to have these subjects for discussion in papers next year. Reference was made to President Philip's discussion of these terms in his remarks.

The report of the Committee on Nominations was called for. It was made by C. Leonard O'Connell and designated the following officers: *Chairman*, George C. Schicks, New Jersey; *Vice-Chairman*, Oscar E. Russell, Indiana; *Secretary*, Charles W. Ballard, New York; *Delegate to the House of Delegates*, W. Henry Rivard, Rhode Island.

Rudolph Raabe presided during the discussion of the report. There being no further nominations it was moved that the Secretary cast a unanimous ballot for the officers named. It was so ordered. The officers-elect expressed their appreciation and were duly installed.

The Section then adjourned.

THE CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES.

ABSTRACT OF THE MINUTES HELD IN MADISON, WIS., WEDNESDAY, AUGUST 30TH, AND FRIDAY, SEPTEMBER 1ST.

(It may become necessary to print addresses and reports apart from the minutes of the sessions.)

The First Session of the Conference of Pharmaceutical Association Secretaries was convened August 30th, at 2:00 P.M., by President J. Lester Hayman who welcomed the secretaries to the Seventh Annual Meeting.

Secretary Carl G. A. Harring called the roll.

Former President Charles Clayton presided during the reading of the President's address.

ADDRESS OF THE PRESIDENT OF THE CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES.

BY J. LESTER HAYMAN.

Fellow Secretaries:

Some one has said, that "it is the aim that makes the man." It is equally true, I believe, that it is the aim that makes the Association. It is the aim and purpose of every organization represented here to be of as much service to its individual members and to the profession which it

represents as it possibly can, of that I am quite sure. Were it not for the fact that you are eager to learn the beneficial things that others of us are doing, and how they are being accomplished that you may return to your office and attempt to put into practice that which is applicable to your own needs and desires, these chairs would indeed be empty.

The aim and primary purpose of this Conference is, I believe, to foster an exchange of ideas, experiences and observations; to coördinate the work of the various organizations as much as is possible by coöperating with one another and with our National organizations in problems which extend beyond our own narrow borders; to serve and help one another as much as we possibly can for the benefit of all. In the six years of our existence, which has of necessity been an experimental stage, much has been learned and much benefit has been derived by those who have been privileged to attend our conferences. However, placing for ourselves high standards, and wishing to reach them without any further effort on our part, is not sufficient.

I believe this exchange of ideas, experiences and observations can best be carried out during our meetings by the round table method, and for that reason the program this year is made up of topics determined by questionnaire method as being most suitable and most beneficial. I personally have no other suggestions to offer in conducting the meetings, but should the results this year prove satisfactory, I would recommend that this procedure be carried out henceforth as a regular duty of the president.

I believe that we all realize that this Conference is very beneficial to its members. I know it is needed and is doing and can do much good. I believe its presence should be felt more keenly in the interim between meetings, and if I may, I should like to mention several things which in my opinion would be beneficial. At least, I trust they will provoke discussion.

The accomplishments of this Conference, in a measure depend upon the number of secretaries in attendance at the sessions. Secretary Beard during his presidency took upon himself the obligation to write a personal letter to the president of each state association, pointing out the benefits of these meetings and urging him to use his influence in seeing that his secretary was in attendance. This letter I know was responsible for the attendance that year of several secretaries who would otherwise not have been present. This year, it was my intention to do likewise, and several of the letters were sent but Fate intervened and the task was not completed. However, since presidents come and presidents go, while the secretaries remain (at least for a while), and since each state association president should be enlightened as to his duty in this matter, I would recommend that this task be imposed as a regular duty upon our president.

Attempts have been made in the past for the interchange of ideas during the year as well as during the meetings. Some members have been faithful in seeing that each secretary received a copy of their monthly or weekly bulletins. This to me has been most helpful and I should like to see it enlarged upon. In this respect I can heartily sanction Secretary Philip when he said, "let us send that inside information, as our letters to collect dues, our S. O. S. for member's help and letters to our political friends, copies of our blanks, forms and other bits of information that we give out at present to members only." This, indeed, is asking very little but it may be worth its weight in gold (perhaps I should say diamonds) to some other secretary. Is it not one of our aims to help one another? It has been stated that attempts have been made to carry this plan into operation in the past. It is well known that our efficient secretary has sent out questionnaires in the past. Have they failed in their purpose or have they been too few? If they have failed, wherein have they failed? Is it because we do not have the time or sufficient interest to answer them? Are our finances not sufficiently large to permit sending them? Are we not interested in what our brother secretary does or may be able to do? Or, is it because we are like many of our members in our respective organizations who when approached to do something for the good of the order meekly consent and then just as promptly forget? Should secretaries be only as human as their members? I believe it would be work well done, if the secretary of this Conference could send to each member monthly or at least quarterly a mimeographed sheet asking the accomplishments of the period of the various associations and other questions deemed worth while. A periodic questionnaire, if you please. This method has been very much criticized, I realize, but until something better is offered, let's use it. Even secretaries when left to themselves will not reveal the information desired unless asked, at least so it seems.

A mere glance at a calendar of pharmaceutical conventions and their dates reveal that many neighboring states hold their conventions on the same or overlapping dates. The disad-

vantages are too well known to enumerate. How to avoid it is indeed a problem. Would it be possible to divide the country into districts, the states in each district to so arrange their meeting dates so that they do not conflict? I offer no plan as to details but merely the suggestion for what it may be worth. I do believe it beneficial and much worth while for adjoining states to occasionally hold joint conventions and believe the plan should be encouraged whenever possible.

There is one thing that is always uppermost in the thoughts of secretaries such as are assembled here to-day, and that is *Convention Speakers*. I know of no better service that this Conference could give, than to act as an exchange for information in regards to the procuring of good, capable convention material. The Conference in order to procure this material needs necessarily to depend upon its members for this information. I believe it should be one of the prime duties of each member to send to the secretary of this Conference, each year, immediately following his convention, information both favorable and unfavorable concerning his convention-speaking program. This service alone would, I am quite sure, be worth to many of us the yearly fee paid into the treasury, and I heartily recommend that some plan along this line be worked out and put into operation.

We are at this moment entering a new era for the independent business man and for the organizations such as are here represented. Our Government has promised that in the "New Deal" the little fellow shall not be down-trodden but that he shall once again become renascent. We are given to understand that the dealings with the Government with the individual will be through the trade and professional organizations, thus making it imperative that our organizations represent as nearly 100% of our calling as possible. It is our task to bring the wayward brethern into the fold. Under this new régime our responsibilities become greater, our labors will be increased, our coöperation must be more generous. As secretaries we must be alive to any occasion, patient in our hard work, ever watchful of our opportunities, rigidly honest and hope for the best. What to-morrow will bring only time will tell, may our work of to-day be well done!

In closing I wish you to know that I sincerely appreciate the honor you bestowed upon me last year during my absence in electing me to act as your president, your mistake is one that I shall always cherish.

Motion was made, seconded and carried that the address be received and held over for later discussion.

Secretary-Treasurer Carl G. A. Harring rendered his report. It follows.

SECRETARY'S ANNUAL REPORT.

BY CARL G. A. HARRING.

Brother Secretaries:

Inasmuch as time at these conferences is too valuable to be wasted on verbose reports, your secretary will endeavor to make his report short and to the point.

The minutes of last year's meeting were distributed to all secretaries as soon as received from the press and our members have had ample opportunity to familiarize themselves with many good suggestions that were brought out at that meeting. It would be interesting to know how many secretaries have presented the resolution adopted at our last conference anent closer co-operation with local associations to their respective conventions. I may say that your Secretary presented this resolution to the Massachusetts Convention where it was unanimously adopted, and as a result all local associations in our state will be asked to invite one or more of our state officers to an early meeting of their organization where emphasis will be laid on the imperative necessity of close to one hundred per cent membership in the State Association.

The original plan of our Conference, to distribute material of interest through the Secretary to all of our members may well be declared inoperative as no material has been received during the year for distribution, but this condition is offset to a large extent by the fact that nearly all secretaries now exchange publications of their association and these publications have grown in numbers to such a degree that the various secretaries are able to draw a fairly comprehensive picture of what is going on in the world of organized Pharmacy. Your Secretary nevertheless feels that it would be a great step forward if every secretary would submit a résumé of activities pertaining to

his particular office to the Conference Secretary at stated times—say once in three months—such reports if necessary to be boiled down, and distributed to the membership.

The financial statement appended to this report seems to indicate that sufficient funds are on hand to enable the Conference to function at least during the ensuing year and your Treasurer strongly recommends that no dues be assessed or collected during the year of 1934.

May I in conclusion add that the secretary's work has been made enjoyable through the cordial support rendered by our President, and that the many expressions of good-will received from officers and members during the past year have been highly gratifying.

TREASURER'S REPORT, 1932.

On hand January 1, 1932		$259.03	
Received in dues		150.00	$409.03
Disbursed:			
January 17th	Mimeographing	$2.50	
April 5th	Mimeographing	11.25	
	Stamps	3.00	
June 24th	Mimeographing	1.87	
July 16th	Mimeographing	2.95	
October 12th	Stamps	3.00	
December 30th	Donation to AMERICAN PHARMACEUTICAL ASSOCIATION	25.00	49.57
Balance on hand January 1, 1933			$359.46

So far during 1933, 23 members have paid their dues amounting to $115. While expenditures have been around $28, this leaves a balance on hand of around $445.

The report was received and accepted in due order.

Roy C. Reese, of Kansas, moved that the recommendations in the Secretary-Treasurer's report relative to no dues be adopted and also that a dinner be provided for at the next meeting out of the funds of the treasury. The motion was carried. Mr. Reese also moved that the sum of $100 be paid out of the Treasury to the AMERICAN PHARMACEUTICAL ASSOCIATION to aid in the Headquarters Building. Secretary Harring moved that the sum of $50 be paid. This was seconded and carried.

President Hayman said that President-Elect Swain had just come from Washington where he attended a conference on codes, and members would have the opportunity to hear the latest news. President Hayman also called attention to the fact that money was needed to defray the expenses of the Century of Progress Pharmaceutical Exhibit. He stated that if all states would contribute something, the amount necessary would be raised.

ROUND TABLE DISCUSSIONS.

The order of business called for a round table discussion of topics. The first question was, "Should the President Be the Directing Head of the Association or Should the Executive Committee be the Governing Body?"

J. W. Slocum, of Iowa, responded that the president is the directing head, but he usually acts with the approval of the executive committee. In his opinion that is the proper set-up, namely, that the president guides and submits policies for approval to the executive committee. In Iowa the retiring president automatically becomes a member of the Executive Committee.

Charles J. Clayton, of Colorado, gave as a reason for the question that it was brought out in his paper last year citing that under the constitution and by-laws of some states, the chairman of the executive committee may be some one else, and not the president. If it happened that some one other than the president was chairman of the executive committee there might be a division of authority and a division of opinion. He referred to a recent occurrence, when a meeting was contemplated to discuss the code. The invitation to attend was extended to the entire member-

ship. A question came up regarding the vote by all the members present—the President claimed that the vote was not valid as the meeting called for was that of the Executive Committee and no members of the committee are allowed to vote in open meeting. He cited this, because it presents a division of authority when the executive committee is headed by some other person than the president. In some instances the president is not a member of the board of directors, and under these conditions the president simply does what he is told. Mr. Clayton desired to have information from others who have had similar experience.

William B. Day stated that the executive committee of Illinois Association is composed of twenty-five members, one from each congressional district, and the president acts as chairman of the committee. The officers function during called meetings and at the annual convention. There is considerable expense attached to a called meeting, for hotel, transportation, etc.

Walter D. Adams said that the Texas Association has an executive committee of six members, elected every year and the president and secretary are *ex-officio* members. The president votes in case of a tie but the secretary is without vote. The plan has been quite satisfactory. He thought that it might be improved, if the executive committee had a chairman who was really the directing head, as the chairman of the Council of the A. PH. A. The president could make his recommendations and, if acceptable, these would be adopted and put into effect. He said that an executive committee, composed of a representative from each congressional district in Texas would be impracticable on account of distances. An effort is made in the selection of the executive committee to have representation from all sections of the state.

Robert C. Wilson stated that in Georgia an executive committee and board of directors are selected from the ten congressional districts. The president, practically, becomes a director from the district in which he resides. The ten directors increased by four directors, to be appointed by the president, from various parts of the state, meet with the president and secretary who are *ex-officio* members, with vote.

Roy C. Reese advised that the set-up in Kansas is similar to that in Iowa. There are six members of the executive committee, and it is composed of the president, vice-president, secretary, treasurer and secretary of the State Board of Pharmacy. The secretary is without vote. All changes of policy are referred to the executive committee. This plan has been working satisfactorily.

F. V. McCullough informed that the set-up in Indiana was somewhat different. There are six members of the executive committee, two of whom are elected each year at the annual meeting. This executive committee meets after adjournment of the state association for organization and elects its own chairman. Quarterly meetings are held. The president presides and presents questions to the committee that are to be considered. He takes an active part in the meeting.

Robert C. Wilson, of Georgia, made reference to a statement of a large manufacturing concern by which it was implied that the strength of an organization is determined by the character of the secretary.

W. E. Bingham stated that in Alabama three members of the executive committee are elected at the annual convention. The first one elected becomes chairman. The president, on retiring, automatically becomes a member. One member is elected for one year, one for two years and one for three years. The retiring president and the secretary make up the membership of the committee. The executive committee was brought together in Birmingham for discussing the NRA and the chairman of the executive committee presided. The executive committee has been increased to seven members.

A. L. I. Winne reported that Virginia has a committee of five members. The president of the Association is chairman. Three members are elected and the retiring president and the secretary-treasurer are active members with vote. This plan of operation has been in effect for ten or more years and is satisfactory.

J. W. Slocum said that in Iowa, in addition to the executive committee, an advisory board is provided for by the constitution. This consists of officers of the Association, members of the legislative committee, members of the Board of Pharmacy, and two members from each congressional district, and all cities of 25,000 or more are entitled to representation. This body acts as nominating committee of the officers at the state convention. Those nominated are placed on the ballot and voted on during the convention. This plan has been successful. All sections of the

state are represented and there are enough representatives present from every section. A meeting is held prior to the state convention so that the names of the nominees may be placed on the ballot. If a section is not represented the president may select somebody from that district. There has been very little politics in the Association.

J. W. Gayle advised that the executive committee of the Kentucky Association carried out the policies of the association. The president is executive head and a member of the executive committee; the secretary is an *ex-officio* member. The committee is subject to the call of the president and the plan has been very satisfactory.

C. S. Pierce informed that the Maine executive committee is composed of seven members, a president, three vice-presidents, secretary-treasurer and one member appointed by the president. All of the officers have a vote and the arrangement works very well.

J. J. Gill said that Rhode Island has nothing new to offer. Every year an executive committee of three members is elected; the president, vice-president, secretary and treasurer are also members of the committee.

Roy C. Reese stated that a meeting of the executive committee is held prior to the annual convention and on the night following the convention. Most of the questions coming to the executive committee are handled by mail.

Miss Alice-Esther Garvin said that the president appoints the executive committee. The secretary attends the meetings and takes the minutes. Five meetings are held annually and the members pay their own expenses. She preferred a committee of which the retiring president would become a member.—(Connecticut.)

O. W. McShane stated that in Vermont the executive committee is composed of the president, secretary, three vice-presidents and three members, all elected at the annual meeting.

Carl G. A. Harring said that in Massachusetts the president is *ex-officio* president of the executive committee. In his opinion, the executive board should be composed of two vice-presidents, the secretary and treasurer, and two former presidents.

O. W. McShane referred to a past-presidents' group in the Vermont Association—the members act in an advisory capacity.

J. Lester Hayman said that in West Virginia the executive committee is composed of the president, three vice-presidents, secretary and treasurer, and three members elected for three years. The transactions of the committee are conducted by mail or telephone.

Topic No. 7 was presented, "Contests and Novel Schemes for Increasing Interest in Annual Meetings."

Roy C. Reese referred to a prescription contest in Kansas.—Members of the Senior class of the University School of Pharmacy were permitted to enter this contest, which created considerable interest. One of the faculty of the School of Pharmacy was on the program to speak, but the time allotted was too brief, and next year provision will be made for a longer address. A feature of the meeting was the drawing of prizes for merchandise contributed by several stores and members. In his opinion the program should be cut down as to speakers and a round table discussion should be instituted.

J. Lester Hayman stated that about the same system was followed in West Virginia, but a registering booklet was used, with a ticket for each session and the fee taken up at the door. In order for a person to be eligible for selection for a prize he must be present at the session.

Charles J. Clayton stated that in Colorado they followed somewhat similar lines. However, he referred to a plan in South Dakota which he thought very good. This was presented in an interview between Editor George Bender and Mr. Keller who operates several drug stores in Minneapolis. Mr. Bender asked questions and Mr. Keller gave the answers. These questions related to details of store management.

W. E. Bingham was interested in learning how non-members could come into the convention, when prizes were given out.

J. M. Plaxco said that in South Carolina only dues-paid members are admitted. They must present a card to that effect and register.

J. Lester Hayman stated that certain prizes are given only to retail druggists; travelers and others are given distinctive badges.

A. L. I. Winne said that they had a similar plan in Virginia. The drawing card this year was a discussion of the NRA.

Charles J. Clayton referred to a play which was carried out in Colorado during the address of a speaker, which created quite a little interest and surprises.

Robert C. Wilson said that the member who attends the annual meeting must have something to take back home with him. This creates an interest for his coming back to the next convention.

J. Lester Hayman spoke of a plan whereby prizes are given for analyzing prescriptions and presenting them.

Ralph W. Clark said that in Wisconsin different colored ribbons were used in designating those in attendance. The prize features of the Association are carried on by the traveling men. He also referred to a number of members who do not pay their dues, although their business would indicate that they are perfectly able to do so. Team captains are now appointed for collecting past dues.

Roy C. Reese said they were doing about the same thing in Kansas. Team captains are appointed in various counties who look after delinquents. These team captains have been more successful than he had been, as secretary, in collecting dues.

Prof. Anton Hogstad said he had listened with interest to the scheme but, in his opinion, the greatest interest is aroused by setting up a regular pharmacy and discussing various phases. Along with that, other departments of the store may be profitably discussed. This is in line with a plan which had been made effective at various points where he had lectured.

F. V. McCullough stated that, as part of the program in Indiana, druggists from country towns discuss methods of selling insecticides; those of professional pharmacies, the prescription phase and others deal with soda fountains, etc.—This develops a program of wide variation. Traveling men pay dues and a subscription fee to the *Indiana Pharmacist*, which becomes part of the entertainment fund.

H. J. Nie was of the opinion that the programs should be arranged so they will be both profitable and interesting. He was supported by Professor Hogstad, who was of the opinion that discussions should relate more to pharmacy than is generally the case.

J. W. Slocum stated that in his opinion programs of state associations should include all divisions of the drug trade.

Reference was made to drinking at conventions. The consensus of opinion seemed to be that this situation is improving.

Ralph W. Clark stated that in Wisconsin they had a field man who is under contract to produce $4000 worth of advertising and to get 500 new members. His membership quota has been filled up to October.

J. W. Slocum suggested that the secretaries coöperate in supplying the names of those available for speakers at conventions. Following this, a motion was made and carried that the Secretary of the Conference send a circular letter to each of the secretaries to ascertain the names of those available as speakers.

J. Lester Hayman was tempted to try the idea of the Minneapolis convention to have local druggists speak.

Walter D. Adams said this was tried out in Texas very successfully.

SECOND SESSION.

The Second Session of the Conference of Pharmaceutical Association Secretaries was convened September 1st, at 2:00 P.M., by President J. Lester Hayman. A motion was made, seconded and carried that the Secretary be instructed to write the various secretaries of the state associations to report quarterly on their activities.

President Philip expressed his appreciation of the work of the Conference.

F. V. McCullough inquired of President Philip whether he had any suggestions to make regarding the payment of dues of local and state associations and connecting up the entire group on the order of the American Medical Association.

President Philip replied that he explained the plan in the House of Delegates. In his opinion, there are too many cross purposes. The members are becoming more interested in a combination scheme. The affiliation of the different organizations will not be brought about within a year, possibly not for a number of years, but eventually this arrangement will come about and when this results there will be closer coöperation of all bodies, and, in his opinion, it would be

said when the plan has been successfully brought about—that it should have been in effect sooner.

Robert C. Wilson stated that in his opinion such affiliation should be encouraged and the matter of combination dues should be carefully thought out.

President Philip contended that we should not hold our associations too cheaply. The dues must be sufficient to carry on work or the plan will not be effective. He stated that in California $21 per year had been collected and this can be done if good service is given. Membership in the Chamber of Commerce costs from $20 to $25, in the Rotary Club, $60 to $75. What is needed is courage, and he cited a number of experiences which proved his contention.

J. Lester Hayman stated that the need of coöperation and unity was shown at Washington.

Roy C. Reese suggested that $50 be sent to the Century of Progress Exposition in Chicago and instead of $50 to the AMERICAN PHARMACEUTICAL ASSOCIATION Building at Washington the organization should try and make that $100, also that the matter of not collecting dues be reconsidered. The suggestions made were adopted in the following order: that the Secretary be instructed to send a contribution of $50 to the Century of Progress Committee at Chicago and that a contribution of $100, in two instalments, be sent to the A. PH. A. for the Headquarters Building in Washington. It was also voted to collect dues for the ensuing year and that a dinner be provided for, but the question of taking the money out of the Treasury be left open until that time.

Roy C. Reese moved that Secretary Harring be instructed to draw a check of $50 payable to himself as an honorarium. This was seconded and carried.

J. W. Slocum moved that the Secretary be instructed to send a letter of sympathy and condolence to Secretary Gustave Bachman of the Minnesota Pharmaceutical Association who had sustained injuries in an accident. Carried.

President J. Lester Hayman presented subjects 8*a* and 8*b* for discussion—8*a*, "In what states are local district meetings habitually held and what is the character of the programs at such meetings?" 8*b*, "Are you following some concerted plan to link up these meetings with your state associations for the purpose of increasing your membership?"

J. W. Slocum stated that in Iowa, District Meetings are held; the membership question does not enter—the membership is an automatic renewal of registration—the dues are collected on renewal. Iowa has nine Congressional Districts and a meeting is held in each of the districts. Five meetings were held in one week in different congressional districts and four during the following week in the remaining districts. He said that this is not fully adequate to cover the entire state but the meeting-places are located so that it is not difficult for each member to attend at least one. The Secretary usually selects the location of these meetings and the Executive Committee approves them. The purpose of these meetings is to contact a little more closely the individual members, many of whom cannot attend the state convention.

The members also feel a little more free to express their opinions at these district meetings and are more interested. It has been felt that a speaker who can interest and enthuse is quite essential. This year Dusty Miller of Ohio has been selected. He is not a druggist but he is a good speaker. The convention is called right after lunch and those who desire to participate in amusements have the opportunity for doing so. A dinner is served at 6:30, attended by ladies; a business session follows. Entertainments are provided for the ladies.

Mr. Slocum said that the more successful meetings are not held in the larger cities. The success of a program depends largely on the interest created. These meetings have been held for fifteen years and the one of last year was probably the most successful. After the speaking program, discussions are held on timely subjects. The expenses of the meeting are not over $300 and some of them have cost as little as $200.

W. E. Bingham asked relative to membership and membership dues.

Mr. Slocum explained that no dues are collected at district meetings.

Secretary Kelly said he was glad to have come into the room while Mr. Slocum was talking. He explained that Maryland is divided into two sections, Baltimore is one section and the other part of the state comprises the other. An effort is made to bring the work of the Association to the members. Many of the members are unable to attend the state convention and are always interested in hearing of the happenings, so this enters in the program of the district meetings. Two of these meetings are held annually in each section and these meetings are attended by the president and other officers. If it is a legislative year the members are interested in discussion of legis-

lative matters and reports of the legislative committee. Speakers are provided for the professional, economic and commercial phases and are usually quite successful. As a result of these district meetings the members show a great deal more interest in the annual meetings. Pharmacists also invite physicians to attend—this creates a spirit of coöperation. After dinner, which is held at night, there are informal discussions on various problems.

Robert C. Wilson spoke of the work of the Georgia Association. He said that during the last two years effort has been made to hold meetings in each congressional district. In these districts a president and a secretary are elected and they arrange the dates of the meetings and the place and the program. An effort is made to enlist members for the state association in the district meetings. The president of the District Association automatically becomes a member of the Board of Directors of the state association. This is helpful in legislative problems for the president gets in touch with district members and in that way splendid results are obtained. At the present time the Georgia association has a larger membership than ever before and each district is reporting new members. In his opinion, within the next year, 85% to 95% of the drug stores will be represented.

Walter D. Adams said that there were seven district associations in Texas and they meet twice a year. It is attempted to have at least one member of the official family (State Association) present.

Texas is a very large state and there is some trouble in getting around. Until recently the dues of the State Association were collected by the State Pharmacy Board. They had collected and were about to turn over to the State Association $9000 when the point was raised that this part of the law was unconstitutional. An expert counsel was employed and it is hoped to get a new ruling.

J. M. Plaxco said that in South Carolina there were nine Congressional Districts and these were organized on an initial fee of $1 per member. So far, no additional fee has been requested.

J. W. Slocum spoke of the cigarette legislation in Iowa. The City Council has the power to grant licenses and to withhold licenses at any time. The Supreme Court has upheld this legislation.

Carl G. A. Harring stated that local associations were good, but only so long as they are held together and attached to the state and national associations. He said that when he returned home he would send out letters to the members, impressing the necessity of local association members being also members of the state association.

J. Lester Hayman stated that fifteen senatorial districts had been organized in West Virginia and in each district a president and secretary are elected and these are members of the state executive committee.

Roy C. Reese stated that in Kansas they had provided for a committee of two members who are retail druggists; two salesmen and the secretary of the state association—that leaves the balance of power with the secretary and he sees that the salesmen get a square deal. This has made the convention more interesting for the members and also has resulted in building up a fund of about $800. The two salesmen of the committee appoint a sub-committee and its members handle the entertainment features.

E. F. Kelly said that the Maryland Association had a traveling men's auxiliary which is provided for in the constitution and by-laws. This committee takes entire charge of the entertainment and submits all proposals to the executive committee. The experience has been very satisfactory. The salesmen help out in membership drives and also in collecting dues. They also carry important news to the various sections of the state.

Charles J. Clayton reported that in 1926 the Colorado Association had not registered more than 150, but a drive was started by the association of the salesmen; their efforts and newspaper publicity increased the number, in 1931, to 557. This year, however, the enrollment dropped to 467 registered pharmacists. The entertainment is sponsored by the drug interests who choose their own chairman and, as a result, the entertainment features have been improved. At one time it was necessary to raise money by advertising, but the traveling men are now taking care of that, so that for the last convention they raised $1900 and this was divided by the association and the traveling men's organization. They also handled the advance program.

President Philip said he was sorry that it was impossible for him to attend the meeting continuously. He numbered some of his best friends among the traveling men and was of the opin-

ion that they should receive coöperation and that the salesmen should have separate meetings from those of the state associations. However, publicity should be given by the state association to the traveling men's auxiliary. The entertainments could be held jointly and the traveling men should pay the usual registration fee.

F. V. McCullough advised that in Indiana the traveling men are auxiliary members. They pay $3—$1 of which is subscription to the *Indiana Pharmacist*, the other $2 going into the treasury of the Association. The traveling men meet with the officers in January and April for instructions as to the state meeting. The merchandise donated as prizes is shipped to the convention city and distributed by a joint committee, one appointed by the president of the Association and one by the president of the Salesmen's Auxiliary.

Henry J. Nie inquired relative to local druggists bearing the cost of the convention.

President Philip replied that sometimes local people are expected to bear too much of the expense. He thought that the members would feel better if a smaller part of the convention expenses was defrayed by the local committee.

Charles J. Clayton stated that the Colorado Association did not expect the local committee to defray the expenses, except those of the reception on the first night.

J. Lester Hayman said that in West Virginia the salesmen's auxiliary arranges for the entertainment but druggists make contributions to them in money.

It was agreed to take up *Question 3*, "The Resolutions of the Convention—who writes them? Should the Secretary take an active part in preparing them?"

F. V. McCullough said he had attended conventions in a number of states and that he is occasionally a member of the committee on resolutions. A difficulty that sometimes obtains is that no one is familiar with drafting resolutions and the members of the committee do not anticipate what wording will be needed and consequently some of them are not prepared. He always carried a number of resolutions with him to the convention on anticipated subjects and, if these matters are brought up, the resolutions can be promptly presented.

President W. Bruce Philip considered the idea a good one and it might be well for members who are interested to carry with them thirty or forty standard resolutions. Resolutions should be handled and so worded that they can receive prompt consideration.

Walter D. Adams said that, as Secretary, he carried a file of resolution material and copies are handed to some member of the Committee on Resolutions, so that the resolutions are drafted when they go before the convention.

Miss Alice-Esther Garvin wondered what became of the resolutions.

J. Lester Hayman stated that resolutions in West Virginia were taken up before the end of the president's term.

Walter D. Adams said that in Texas the executive committee studies the resolutions.

Carl G. A. Harring reported that in Massachusetts these are taken care of by the Secretary and directed to the proper channels.

C. Leonard O'Connell said that in Pennsylvania resolutions are presented at the second to the last meeting. A resolutions' committee is appointed, of which the members of the Executive Council are *ex-officio* members. The resolutions are prepared in proper form and discussed before the meeting.

Question 4, "Is it desirable to divide states into zones for the purpose of giving each zone representation in the presidency by rotation?"

J. W. Slocum advocated this plan in Iowa and he thought that the state should be divided into quarters. In this way, as the retiring president becomes a member of the executive committee, each section would have representation.

Charles J. Clayton stated that this would not work very well in Colorado. It is deemed necessary that the president be located near Denver in legislative years. Colorado is a state of distances and it is inconvenient and expensive for a member to come a long distance to attend legislative sessions.

William B. Day said the rule in Illinois is that a president may come from Chicago only once in three years, so that other sections of the state receive consideration.

Question 6, "Is it possible to devise some plan whereby neighboring states may avoid holding conventions at the same time?"

It was moved, seconded and carried that the incoming president appoint a committee to make a study of this question and report at the next convention.

Charles J. Clayton said that if this was properly handled it would make it possible to arrange for speakers at conventions in adjoining states. Colorado depends somewhat on tourists' trade and this business opens up about July first. If the state convention is held about the 15th the hotels are crowded; there is little privacy and the charges for meals and rooms are higher, so that the meetings are arranged for the advantage of the members. He favored the plan suggested by the question and that information on the subject be sent to the secretaries of the Conference.

It was moved and seconded and carried that Mr. Wilson send to the Secretary such information as is available regarding the findings of the Georgia State Committee on the subject of taxation and that the Secretary forward such information to the various secretaries of the Conference. A motion was made, seconded and carried that a resolution be drawn up and sent to the Massachusetts Board of Pharmacy commending the efficiency of Secretary Harring and asking that the Board arrange for his return to the Conference to be held next year.

Chairman Walter D. Adams reported for the Committee on Nominations as follows: *President*, R. C. Wilson, Georgia; *Vice-President*, F. V. McCullough, Indiana; *Second Vice-President*, E. R. Weaver, Oklahoma; *Secretary-Treasurer*, Carl G. A. Harring, Massachusetts; *Delegates to the House of Delegates*, William B. Day, Illinois; *Executive Committee*, J. Lester Hayman, West Virginia; James J. Gill, Rhode Island; W. E. Bingham, Alabama; Roy C. Reese, Kansas.

On motion duly seconded and carried, the report of the Nominating Committee was adopted and the nominees elected.

Walter D. Adams introduced the new president, R. C. Wilson, who thanked the Conference for the honor bestowed.

The Annual Session of the Conference, on motion duly seconded and a vote was then adjourned.

THE GROWTH OF PROFESSIONAL PHARMACY.*

BY C. B. JORDAN.

"Every time we have a business session at Purdue University to which President Philip has referred, the president of the University welcomes those who attend. He begins his welcome by describing the drug store he is used to seeing, and asking if that is pharmacy.

"I want to say to you that medicine has been worshipping strange gods. Those of you who sat in the meetings of the Association of American Colleges of Pharmacy and heard Dr. Zapffe's talk, know what I mean. I was fortunate in having Dr. Zapffe, who is executive secretary of the Association of American Medical Colleges, come to us to give us an address, and the chief theme of his impressive address was that the colleges of medicine were not giving sufficient attention to teaching materia medica and pharmacology, and that as a result they were discarding the beneficial materia medica as represented by the Recipe Book, the National Formulary, the United States Pharmacopœia.

"Pharmacy has also been worshipping strange gods, and I am glad to see it coming back to the consideration of professional pharmacy as indicated by this symposium.

"I am delighted to know that the AMERICAN PHARMACEUTICAL ASSOCIATION is giving this time to the discussion of professional pharmacy. From the fact that I have talked before this ASSOCIATION yearly for the last four years on professional pharmacy, I think it is clear to you that I am enthusiastic about it.

"Recently, I spoke to a group in this city on Professional Pharmacy, and at the end of my address one of the young men came up to me and said, 'I think you are too enthusiastic about the opportunities of professional pharmacy.'

"I said, 'Perhaps I am. I hope I will not lead any young man astray and have him enter professional pharmacy and fail, but if I can get the pharmacists of the United States to appreciate the opportunities that are present in professional pharmacy, I think I can be excused for overenthusiasm.' "

---

* From an address of the Symposium on "Practicing Professional Pharmacy," Madison, Wis.—See page 1021, October JOURNAL.

PROCEEDINGS OF THE LOCAL BRANCHES

BALTIMORE.

The Pharmacy School of the University of Maryland was host to the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at its November meeting held on Thursday, November sixteenth. The meeting was held jointly with the Baltimore Retail Druggists' Association and the Alumni Association of the School of Pharmacy, University of Maryland.

Dr. Louis P. Hamberger, a Baltimore physician, presented an extremely interesting motion picture entitled, "How Harvey Discovered the Circulation of the Blood." Doctor Hamberger pointed out that until Harvey's time (1628) the idea of a circulatory system was unknown. The picture was based upon Harvey's original 72-page treatise wherein he described his experiments. The photographs are of work undertaken by Sir Thomas Lewis and H. H. Dale of England.

At the conclusion of the picture Prof. Marvin R. Thompson of the School of Pharmacy gave a lecture on the physiological standardization of digitalis which was followed by a demonstration in his laboratory. Professor Thompson outlined the most recent knowledge concerning the stability and standardization of this cardiac stimulant. The laboratory demonstration included the U. S. P. X one-hour frog method, the cat method of assay and perfusion experiments as well as charts previously prepared.

The meeting was held, particularly, as a friendly get-together for pharmacists and physicians. A number of interesting displays of U. S. P. and N. F. preparations had been prepared by the School of Pharmacy and were available for the visiting physicians to inspect. Approximately ninety persons attended the meeting including practicing physicians, retail pharmacists, chemists, medical students and pharmacy students.

The officers of the Branch wish to extend their thanks to Doctor Hamberger and Professor Thompson. Appreciation is extended particularly, to the School of Pharmacy for the delightful refreshments served at the conclusion of the meeting.

C. JELLEFF CARR, *Secretary-Treasurer.*

CHICAGO.

The 216th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on November 21st, at the University of Illinois College of Medicine.

A large gathering of about 200 listeners assembled to greet Herr Max Borger, who very interestingly told of his experiences as a drug apprentice with the Merck Company of Darmstadt, Germany.

From Mr. Berger's report it can easily be seen that the apprentice in the German drug store gets more actual experience in the handling and use of drugs than the average American apprentice.

The drug stores in Germany are divided into two distinct classes, one of the classes not being allowed to fill prescriptions. Established drug stores can be purchased or inherited, but new stores cannot be opened except by permission of the government; this automatically does away with overcrowding, a condition that we are confronted with in the United States.

The German druggist makes up more of his tinctures than the average American druggist; they also keep in stock and dispense on prescriptions more crude drugs; urine and sputum tests are also made by them.

The prices of prescriptions are controlled by the government; the price to be charged for each ingredient and the labor is automatically set; the government, annually, inspects the drugs that are being dispensed.

While the prescription drug store is open fewer hours than the American drug store, a pharmacist must be at the store for emergency purposes twenty-four hours of the day; sleeping quarters are provided in the store for the night man.

The meeting was prolonged for some time with many interesting questions being asked by the audience and answered by Dr. Borger.

LAWRENCE TEMPLETON, *Secretary.*

DETROIT.

The November meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at Webster Hall,

Thursday evening, November 16th. The meeting was preceded by a dinner.

In the absence of President Johnson, the meeting was called to order by Berton Tode, of the College of the City of Detroit. The minutes of the previous meeting were read by the secretary and approved.

Chairman R. T. Lakey, of the Program Committee, announced that the December meeting would be given over to a Christmas Party, following the custom of many years.

Fred Ingram introduced the speaker of the evening, Dr. J. J. Sherman, professor of Political Science, Liberal Arts College, College of the City of Detroit, who spoke on "Government by Code."

The speaker said that government is a machinery in which the state exercises its will. The first government was by Royal decree, later, it was turned over to legislators who grew and grew and since the 90's government has been by boards and bureaus. In 1933 the people realized that something was wrong and they welcomed the "New Deal" and advice of the brain trust which has given us government by code.

The cause of the present condition, he stated, was the result of the factory worker receiving as low as 17 cents a day in 1932 and 14 cents a day for the farmer, who cut hay with a tractor, baled it with a gasoline engine, hauled it in a motor truck, only to find that motors could not eat the hay.

The success of the NRA, Mr. Sherman told the assembly, depended entirely upon the coöperation of the people; he urged patience with the Government and the various codes until they may have time to adjust the difficulties which they have presented. These conditions have not sprung up over night and, therefore, will take a correspondingly long time to correct.

The listeners were startled when told that the standards of living began to fall when the Government presented 160 acres of land to anyone who would live on it five years. Then the automobile industry sprang up and bolstered up conditions, and it was expected that radio would do likewise, but the radio to-day only produces 8 cents an hour to labor. Therefore, it is necessary that we get together and do one of two things: Support the President's program and the codes adopted for the various industries, or go back to the 160 acres of land.

The presiding officer thanked the speaker for his most interesting and timely talk. A considerable discussion followed, led by C. A. Weaver and Fred Ingram, who seemed to agree with Mr. Sherman that, if tolerance and patience are exercised, the codes will be the means of bringing industry out of the present dilemma.

A rising vote of thanks was given the speaker.

BERNARD A. BIALK, *Secretary.*

NEW YORK.

The November meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on November 13th, in the College of Pharmacy of Columbia University. President Bilhuber presided and there were about sixty-five members and guests present. The report of the secretary was read and approved.

Chairman Lehman, of the Legislative and Education Committee, reported on the Physicians and Pharmacists' Dinner held on October 24th. He explained that the work was being carried further by the committee in charge of the recent dinner.

Chairman Kassner, of the Membership Committee, called attention to the slip on the bottom of the meeting notice urging members to send in the names of persons interested in joining the AMERICAN PHARMACEUTICAL ASSOCIATION.

The secretary read a communication from Dean George C. Schicks, of the New Jersey College of Pharmacy, announcing the organization meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION on November 20th. Dr. H. H. Schaefer moved that a letter of congratulations and good wishes be sent to the New Jersey Branch. This was seconded and approved.

Following the reading of a letter from Chairman J. Leon Lascoff, of the Physicians and Pharmacists' Dinner Committee, asking for a contribution of ten dollars, Dr. Ballard moved that this be paid. The motion was approved.

The first speaker of the evening was Harry Miller, who spoke on "The Drug Institute and the Retail Drug Code." A summary of Mr. Miller's address follows:

Many stories of the origin of the Drug Institute have been told but Mr. Miller believed that Jerry McQuade started the thought when, at a meeting which he called about a year ago last June, he voiced the hope that the

drug industry could be organized around a body similar to the Steel Institute. It was felt that no single branch of the industry could do this alone but that the coöperation of all divisions was essential. The industry needed price stabilization. The Drug Institute was patterned after the Steel Institute and it was formed before the NRA existed. The NRA coming as it did, at a time before the Drug Institute could make a start with its original plans, made it necessary for the Institute to reduce its activities and permit the Government to go ahead with its own ideas. Surely the Institute had to wait until the Administration had clearly formulated its plans. It became necessary for each industry to present a code for adoption by the President. In this work for the Drug Industry the Institute coöperated in every way but it did not write nor present a code. Its efforts were directed toward coöperation with other national drug organizations. Mr. Miller stated emphatically that the President did not sign the code which would have stopped rugged individuals in our industry. This code fixed, in a general way, the resale price, and the Administration would not approve this provision. Pointing out that many drug retailers were unable to operate at a profit, and that many chain stores were also in the "red," Mr. Miller deplored the rejection of the price maintenance provision. He went on to say that price cutting is contrary to the President's objectives in his drive to raise wages and increase employment. Curtailment of the price-cutting evil is essential. In the code, as finally adopted, a ray of hope remains in that an interpretation must be placed on the section of the code which reads: "But the selling price of articles to the consumer should include an allowance for actual wages of store labor, to be fixed and published from time to time by the Trade Authority hereinafter established." In the explanatory comments the following additional information is provided, "No retailer shall sell merchandise below the amount such merchandise costs him from the wholesaler or manufacturer (except as noted below). This provision becomes effective upon the effective date of the code, regardless of whether the Retail Trade Authority or the Retail Drug Trade Authority shall have fixed an allowance for labor cost." Both cost of merchandise and labor cost must be defined by the administrating officer. The speaker then went on to discuss some of the provisions of the code and he expressed the opinion that its administration would be very difficult, if not impossible.

Realizing that the Code as finally adopted did not go far enough and that the NRA holds no hope of providing the retail druggist with what he needs most—price stabilization—the Drug Institute was going ahead with its original aims and purposes. The Drug Industry needs cleaning up and the Drug Institute is the organization to do the job contended Mr. Miller.

Finally, the speaker pointed out that the codes of other industries contained price maintenance clauses and this demonstrated that unity of the drug industry was necessary to win the same rights.

Dr. Fischelis was next called upon to present his views regarding the Drug Institute and the Retail Code. He began by pointing out that the primary ends in view by President Roosevelt, in the administration of the NRA, were to put people to work, to regulate hours and wages, and to increase purchase power generally. Now the industries thought that they could take advantage of the situation and thus in one swoop wipe out all the evils and unfair practices which plagued business. But the Administration saw through this and did not permit it.

The Drug Institute made an error when it did not stick by its original purpose. He pointed out that many of the canvassers for membership in the Drug Institute made false claims regarding what the Institute could and would accomplish. The recovery program was used as a feature to enlist members.

The speaker next emphasized that the Institute did take an active part in the hearings of the code and that this proved unfortunate because the code was to be a retailer's code and the Institute represented all branches of the industry. The original code was not a retail code in its major features. Participation of the Drug Institute in the hearings provided opponents of the code with ammunition since the Drug Institute was not exclusively a retail organization.

In the hearings pharmacy leaders made two mistakes:

First: Knowing that labor was favored by the Administration they failed to consult leaders of labor in the drug industry. Hence, drug clerks and others were given an opportunity to present a case which strongly impressed the Administration. Furthermore a

plea was made to exempt the pharmacist from limitation of hours of work because he was a professional man. This was a mistake. Dr. Fischelis said that much time and effort were devoted to undoing the harm caused by this oversight.

Second: The retailers did not leave the impression that this was purely a retail code and that it did not involve manufacturers, wholesalers, and their problems.

The President had 130,000,000 people to think of and not 60,000 retail druggists alone. Hence, the price maintenance provisions fell in disfavor. Predatory price cutting was with us in good times and now more than ever it has become necessary for the industry itself to clean house. Coöperation is lacking in the industry, and Dr. Fischelis concluded by hoping that the Drug Institute or some similar body would be able to gather the necessary facts to present an intelligent argument for additions and revisions of the code.

Dr. Anderson, the next speaker, began by stating that both previous speakers were somewhat incorrect in their explanation of why the original code was not signed by the President. Failure resulted because five per cent of the dishonest hypocrites in the industry were able to so impress the authorities, including the President, that they reversed their opinions on the price-maintenance clause. He contended that these five per cent predatory cutters, the chiselers, were able to overpower the ninety-five per cent honest, sincere retailers. It has now become necessary to convince the authorities and the public that price cutting is unsound, that price cutting throughout all industries would ruin the nation. Because of certain provisions in the adopted code, Pharmacy is worse off than before, Dr. Anderson believes. Therefore, he approves of the Drug Institute and believes that further progress and hope rests in the success of that organization. The Institute has a great opportunity to eliminate the evils in our industry, and concluded by asking whether or not the Institute will prove equal to the situation.

Dr. J. L. Lascoff commented on failure of the code to include a price-maintenance clause. He believed that some good could be expected through favorable interpretation of some of the provisions. He added that not a few of the troubles in the industry could be cleared up by coöperation from the manufacturers, and cited an example.

N. S. Gesoalde in his comments on the Drug Institute and the code said that the Drug Institute was what the industry needed for years. The 30,000 retail members of the Institute looked to that body for help and it could not fail them. The speaker believed that the code, as adopted, was a great boon to the industry in spite of its shortcomings. He also believed that many benefits would be gained later, when favorable interpretations are placed on some of the clauses of the code. In conclusion he said, that 50% of the cut-throat competitors could now be eliminated through rigid application of the present regulations.

Finally, E. A. Means was called upon; he began by calling attention to the fact that the code is a complex and serious affair. He said that the Government is in the position to do the talking and that we, of the industry, have little to say at present. He added that the three branches of the industry must cooperate to bring order out of chaos. He believed that the Drug Institute had not been oversold and that much would be gained through its efforts. Furthermore, Mr. Means emphasized that the troubles of the druggist in New York were not always the troubles of the druggist in other sections of the country. He pointed out that price cutting was not a serious menace in certain sections of the country, for, through coöperative efforts, druggists had established fair prices. The speaker agreed that in every branch of the industry there were certain unscrupulous members and that some retailers had exploited labor. This proved to be a great handicap in hearings held in Washington.

In conclusion Mr. Means said that a standard of business practices would be useless until we were united in a sincere effort to put such a plan into actual practice.

Mr. Miller was granted an opportunity to answer criticism directed at the Drug Institute. Following his remarks the meeting adjourned after a vote of thanks was accorded all speakers.

RUDOLF O. HAUCK, *Secretary.*

NORTHERN NEW JERSEY.

The Northern New Jersey Branch, of the AMERICAN PHARMACEUTICAL ASSOCIATION, held its third meeting at the Elks Club, in Newark, on the evening of November 20th. The occasion was a very pleasant dinner which served to formally introduce the new body to Pharmacy in New Jersey. Music and flowers

created an atmosphere which, together with good food, perfectly set the stage for the speakers who were to follow.

About eighty members of the Branch and their friends were present. Greetings and good wishes from other pharmaceutical bodies and colleges were brought by their representatives, a list of whom follows:

President Walter R. Woolley, New Jersey Pharmaceutical Association; Secretary Prescott R. Loveland, New Jersey Pharmaceutical Association; Secretary Robert P. Fischelis, New Jersey State Board of Pharmacy; President Frank H. Eby, Philadelphia Branch, A. PH. A.; President Ernest A. Bilhuber, New York Branch, A. PH. A.; Treasurer Charles W. Holton, AMERICAN PHARMACEUTICAL ASSOCIATION; Dean Henry V. Arny, Columbia University College of Pharmacy; Eugene G. Eberle, editor, JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Governor Moore felicitated the Branch by letter. Dr. Fischelis read the communication and added that the Governor was genuinely pleased to hear of the birth of the new organization; that he felt there was real need for such a professional body. Mayor Ellenstien, of Newark, also sent a most appropriate greeting, which was read by Toastmaster R. W. Rodman. Dean J. W. Sturmer, of Philadelphia College of Pharmacy, congratulating the Branch by letter, stated that it would be a beneficial factor in professional pharmacy.

The "piece-de-resistance" of the evening was a group of three addresses. These were delivered by Secretary Evander F. Kelly, President Robert L. Swain and President Ernest Little, of the Northern New Jersey Branch. Their listeners were moved with mingled feelings of pride in Pharmacy, its organizations and a new sense of duty toward both.

Editor Eberle gave the Branch a stereoptican treat when he displayed a series of slides depicting the history of the new American Institute of Pharmacy Headquarters Building at Washington, D. C. After that the gathering resolved itself into little informal groups where old acquaintances were renewed and the problems of the day settled satisfactorily.

The banquet gave the Branch a most auspicious start. It is certain that the organization will carry on from there in the true tradition of professional pharmacy. Its program of action is such that its influence will grow and much good will come because of its work.

L. W. RISING, *Secretary.*

PHILADELPHIA.

The November meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the School of Pharmacy, Temple University, Tuesday evening, November 14, 1933. The meeting was called to order by President Frank H. Eby who introduced the speaker of the evening, President Robert L. Swain, of the AMERICAN PHARMACEUTICAL ASSOCIATION who spoke on "The Retail Drug Code—Its Interpretation and Possible Effects."

The speaker played a very important part in drafting the Retail Drug Code as submitted to the NRA and he thus has a very definite understanding of the code which was signed by President Roosevelt in October 1933. He stated that the present code was a great disappointment to retail pharmacists, and not what they expected.

In analyzing the code the speaker devoted most of his time to a discussion of those parts which most vitally interest the pharmacist. He also read and discussed various interpretations which have been issued by the NRA. A number of these interpretations are very important in the successful enforcement of the code. He explained that other interpretations would be issued at intervals, as considered necessary by the NRA.

Dr. Swain explained that the Retail Drug Code as it applies to pharmacy will be administered by a National Retail Drug Council. Dr. E. F. Kelly has been appointed the representative on this council for the AMERICAN PHARMACEUTICAL ASSOCIATION. It was explained that Retail Trade Councils would be organized in certain communities for the purpose of adjusting certain complaints that may arise during the administration of the code regulations. Retail Trade Councils will be limited in their powers.

The speaker stated that he believed the code was a step in the right direction and even though the code did not give to Pharmacy some things which were desired, he felt that distinct benefit would be derived by pharmacists. It is certain that some changes will be made in the code by the NRA, as conditions warrant. These changes may possibly bring some of the results hoped for by pharmacists. He urged all pharmacists to give their whole-

hearted coöperation in President Roosevelt's program for recovery.

Following Dr. Swain's address Dr. Robert P. Fischelis gave a very interesting discussion on certain phases of the code. He also expressed his views regarding certain interpretations which have been issued by the NRA covering the Retail Drug Code.

At the close of the meeting a large and enthusiastic gathering extended a rising vote of thanks to Dr. Swain for his most excellent address, as well as his untiring efforts in behalf of retail pharmacists.

E. H. MacLaughlin, *Secretary.*

PITTSBURGH.

The Pittsburgh branch of the American Pharmaceutical Association met Tuesday Evening, October 17, 1933, at the Pittsburgh College of Pharmacy; thirty-three members were present.

The minutes of the May 16, 1933, meeting were read and approved. Communications from the Central Office were brought to the attention of the group.

President Clarence T. Van Meter presented the speaker of the evening, Mr. Robert R. Gaw. Mr. Gaw is president of the Pennsylvania Pharmaceutical Association and president of the McKennan Pharmacy, Pittsburgh. Mr. Gaw's subject was "The New Era in Professional Pharmacy." His theme was built around this thought, taken from LaWall's "Four Thousand Years of Pharmacy:" "The primary function of pharmacy is to prepare medicines for those who require them. It is therefore a highly specialized calling which may rise to the dignity of a true profession or sink to the level of the lowest commercialism, according to the ideals, the ability and the training of the one who practices it."

The speaker cited many instances from his personal experience. He indicated how necessary it is for the pharmacist to keep informed on present pharmaceutical and medical problems; to be familiar with the new and recent remedial agents, so that when he is called upon for such information he is able to give it intelligently. He told of the importance of calling upon physicians and acquainting them with the newer preparations and the specialized service which the pharmacist is able to render, and stressed very forcefully the importance of the close relationship necessary among pharmacists and seemed to be of the firm opinion that a very necessary duty of every pharmacist is real support of his professional organizations.

Mr. Gaw very ably related incidents that have occurred during his unusual experience in conducting one of Pittsburgh's finest professional pharmacies. In concluding his program, he conducted an open forum. Many questions were asked and much information was freely given about the methods in conducting a pharmacy which does not sell "patent medicines" but has for its policy the service of "purveying prescriptions and remedial agents to physicians and their patients."

Frank S. McGinnis, *Reporter.*

CINCINNATI.

Secretary R. L. Puls, of the Cincinnati Branch, A. Ph. A., advised of interesting sessions. The recent meeting, in the absence of President Herman Schuler, was presided over by John P. Jennie. The speakers of the evening were Frank H. Freericks and B. Kotte. Features of the evening were reports of the meetings of the American Pharmaceutical Association and National Association of Retail Druggists.

LECTURES AT COLUMBIA UNIVERSITY COLLEGE OF PHARMACY.

The Lecture Bureau of the College of Pharmacy, Columbia University, announces a series of lectures to be given by various members of the teaching staff on successive Saturdays. These lectures are to be gi en to students in high schools who are members of biological, chemical, medical, scientific clubs, etc.

Dr. J. F. Suchy, professor in the School of Pharmacy, has completed his work in drug and food chemistry this past summer for his doctor's degree. Dr. Suchy's thesis was "A Study of the Preparation, Properties, Toxicity and Pharmacological Action of Various Strychnine Benzoates."

Dr. A. B. J. Moore, member of the A. Ph. A., formerly of McGill University, saved the life of a Sydney, Australia, merchant, who had been seriously injured. Professor Moore was homeward bound when a wireless giving account of the accident was picked up by a Canadian vessel. Dr. Moore was taken a distance of 95 miles to the injured man on Lord Howe Island, Australian coast, and through this attention the life of Mr. Parke was saved.

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1933–1934.

Office of the Secretary, 10 W. Chase Street, Baltimore, Md.

LETTER NO. 4.

November 27, 1933.

To the Members of the Council:

20. Minutes of the Council. Motion No. 1 (see Letter No. 2, page 1058) has been carried and the minutes are approved.

21. Use of Text of N. F. V. Motion No. 2 (see Letter No. 2, page 1058) has been carried and the J. B. Lippincott Co. has been advised.

22. Election of Members. Motion No. 3 (see Letter No. 2, page 1058) has been carried and applicants numbered 1 to 9, inclusive, are declared elected.

23. Transfer of Property between the U. S. A. and the Association as Provided under Public Resolution No. 18, and the Agreement for the Occupancy of U. S. Reservation No. 332-B. Motion No. 4 (see Letter No. 3, page 1065) has been carried unanimously. Dr. R. P. Fischelis wrote as follows:

> "I was impressed with the comment of Dr. Dunning's attorney on the permit granted the ASSOCIATION for use of reservation 332-B as an approach to the property.
>
> "I shall be glad to vote in the affirmative on Motion No. 4, if it is understood that every effort was made to avoid the inclusion of the clause in the permit to the effect that it is revokable at will by the Director of National Park Buildings and Reservations. In other words, if this is the kind of an agreement that has to be made by all other organizations in similar positions, we cannot expect anything different. If on the other hand some organizations have been able to avoid the inclusion of this clause, I feel that a further effort should be made to have it excluded.
>
> "Kindly let the record indicate that my affirmative vote in favor of No. 4 is modified by the attitude expressed in this letter."

Dr. Fischelis was advised that the clause to which he refers is included in the agreement for the occupancy of U. S. Reservation No. 332-A by the National Academy of Sciences as quoted on page 1064 of Letter No. 3. The president and secretary have signed the agreement for the Occupancy of U. S. Reservation No. 332-B, and the deeds for the transfer of property will be signed and recorded as promptly as possible.

24. Sale and Exchange of Liberty Bonds. Certain series of the Fourth Liberty Loan Bonds, 1933–1938, have been called for payment at par on April 15, 1934, or they may be exchanged as of that date at par for Treasury Bonds, 1945, bearing interest at 4¼% from April 15 to October 15, 1934, and thereafter at 3¼% to maturity, the bonds being callable at par on or after 1942.

The following amounts of the called bonds are in the funds named:

Endowment Fund	$ 2,000.00
Life Membership Fund	11,000.00
Research Fund	6,000.00
Headquarters Building Fund	100.00
Wm. Procter, Jr., Monument Fund	100.00

After careful investigation and after receiving advice from various sources, the Committee on Finance believes it to be advisable to exchange the called bonds for uncalled bonds of the same issue. The exchange can now be made on an even basis and at no charge. The uncalled bonds cannot be called until or after October 15, 1934, and probably conditions will be more settled by that time. The exchange will maintain the present distribution and interest rate in these funds.

It will be necessary, as explained to the members of the Council in Madison, to transfer

five thousand dollars of the accumulated interest in the Life Membership Fund, invested in the above bonds, to the Current Fund.

(*Motion No. 5*) *It is moved by Swain, as Chairman of the Committee on Finance, that the called Fourth Liberty Loan Bonds listed above be sold or exchanged on an even basis for uncalled bonds of the same issue and that since most of the called bonds are registered, and as this form is required, the following be adopted:*

Resolved, that C. W. Holton, treasurer, and E. F. Kelly, secretary, are hereby authorized to buy, sell, deal in, assign or negotiate the called Fourth Liberty Loan Bonds which are owned by, or registered in the name of the AMERICAN PHARMACEUTICAL ASSOCIATION and to that end, to endorse, transfer and deliver the same.

25. National Retail Drug Trade Council. On October 24th, the secretary was advised by NRA officials that the Code of Fair Competition for the Retail Drug Trade had been signed and would become effective on October 30th. The ASSOCIATION was requested to select its temporary representative on the National Retail Drug Trade Council as provided for in the Code, the permanent representative to be selected later after the proper method had been determined. It was also requested that the temporary representative attend a meeting of the Council in Washington on October 27th.

After consultation, President Swain and Chairman Hilton recommended that the secretary serve as the temporary representative. This recommendation was submitted to the members of the Council either personally, by telephone or by telegram and it was approved.

The Administration has approved as temporary representatives John A. Goode and John W. Dargavel for the N. A. R. D., E. F. Kelly for the A. PH. A., and Wheeler Sammons for the Drug Institute of America, Inc. Later George M. Gales was approved as the representative of the National Association of Chain Drug Stores.

The Council was organized with John A. Goode as chairman and E. F. Kelly as secretary-treasurer, and has established its office in the Tower Building, 14th and K Sts., N. W., Washington, D. C.

When a method of selection has been determined upon, the ASSOCIATION will be requested to select its permanent representative on the Council.

26. Applicants for Membership. The following applications properly endorsed and accompanied by the first year's dues have been received.

No. 10, Wm. C. Alexander, P. O. Box 608, Salida, Colo.; No. 11, James A. Armanasco, 531 S. 26th St., Richmond, Cal.; No. 12, Philip Basson, 133 Cambridge Ave., Jersey City, N. J.; No. 13, Annabel Beaty, 480 Avon Ave., Newark, N. J.; No. 14, Henry Bellis, 642 10th Ave., San Francisco, Cal.; No. 15, Frank O. Berg, Owl Drug Store, Astoria, Oreg.; No. 16, Albert Bloom, 3166 Kensington Ave., Philadelphia, Pa.; No. 17, Edgar J. Bragger, c/o Hoffmann-La Roche, Inc., Nutley, N. J.; No. 18, Maurice E. Bryant, 605 Campus Ave., Pullman, Wash.; No. 19, Andrew Brown, 1502 Pittston Ave., Scranton, Pa.; No. 20, Bert N. Dalton, 238 Vestal Ave., Binghamton, N. Y.; No. 21, W. J. Dunsmoor, 600 Campus Ave., Pullman, Wash.; No. 22, Joseph Ebert, 135 S. 11th St., Philadelphia, Pa.; No. 23, C. H. Evans, 218 Main St., Warrenton, Ga.; No. 24, Robert P. Gaines, 546 Broadway, Bayonne, N. J.; No. 25, Henry S. Godshall, 134 Congress Ave., Lansdowne, Pa.; No. 26, Mary C. Grace, 3336 Bouck Ave., Bronx, N. Y. C., N. Y.; No. 27, Vince M. Harrington, Mariana, Ark.; No. 28, L. R. Henderson, 100 E. 2nd St., Muscatine, Iowa; No. 29, Harry Isacoff, 29 Woodford St., Worcester, Mass.; No. 30, L. V. Johnson, St. Michaels, Md.; No. 31, Milton Kahn, 212 W. Main St., Somerville, N. J.; No. 32, J. C. Kearfoot, 2 Main St., Martinsville, Va.; No. 33, W. H. Keen, P. O. Box 558, Perry Point, Md.; No. 34, Joe Knight, Lebanon, Mo.; No. 35, Prescott R. Loveland, 214 Chelsea Nat'l. Bank Bldg., Atlantic City, N. J.; No. 36, T. Joseph McAuliffe, 184 Lewis St., Lynn, Mass.; No. 37, George Mathews, 1257 S. Capital St., Washington, D. C.; No. 38, Abram Mosler, 210 Park Place, Orange, N. J.; No. 39, Charles Mueller, 368 Plane St., Newark, N. J.; No. 40, Fumiko Murayama, 1624 Post St., San Francisco, Cal.; No. 41, Kermit Myklebust, 203 Spaulding St., Pullman, Wash.; No. 42, John E. O'Brien, 2002 Farnam St., Omaha, Neb.; No. 43, Murray W. Posner, 1209 Lexington Ave., New York, N. Y.; No. 44, John X. Powers, 420 E. Davenport St., Iowa City, Iowa; No. 45, Floyd K. Riggs, 219 Broad St., Newark, N. J.; No. 46, E. F. Rimmer, 131 East Park Ave., Charlotte, N. Car.; No. 47, Max M. Rosenberg, 875 Brooklyn Ave., Brooklyn, N. Y.; No. 48, W. L. Sampson, 538 Summer Ave., Newark, N. J.; No. 49, Joseph Schick, 2072

Grove St., San Francisco, Cal.; No. 50, George A. Stanley, 1301 W. Lafayette, Detroit, Mich.; No. 51, Henry A. Stype, 201 East Liberty St., Wooster, Ohio; No. 52, John Torigian, 93–20—240th St., Queens Village, L. I., N. Y.; No. 53, Arthur Van Hooser, Metropolis, Ill.; No. 54, Clarence J. Williams, 1220—30th Ave., San Francisco, Cal.; No. 55, Harry Wolff, 1366 Blue Hill Ave., Mattapan, Mass.; No. 56, Robert Haws Wuensch, 30 S. Kingman Road, South Orange, N. J.

(*Motion No. 6*) *Vote on applications for membership in the American Pharmaceutical Association.*

E. F. KELLY, *Secretary.*

MARKETING PRESCRIPTION DEPARTMENT ITEMS.

BY FRANK A. DELGADO.

Manufacturers, dealers, importers and wholesalers of chemicals, botanical drugs, fixed and volatile oils, pharmaceuticals, biologicals and ethical trade-named specialties are or should be interested in the extent to which these items are being prescribed by physicians. Among other questions which drug manufacturers and wholesalers have been asking and the answers to which are now available, it is believed for the first time, are:

1. What percentage of the nation's prescription business is handled by professional pharmacies?
2. To what extent, if any, have specialty type prescriptions grown over the last 20 years?
3. Have prescriptions in liquid form increased?
4. Are prescriptions calling for capsules and tablets decreasing or increasing?
5. What is the average prescription department dollar inventory investment?
6. How is this investment divided between chemicals, botanical drugs, fixed oils, essential oils, biologicals, galenicals and specialties?
7. What does it cost to purchase the basic equipment necessary to stock a prescription department and is a list of the necessary equipment available?
8. What books should the average drug store have in its library, and what would they cost?
9. What type of container is advisable for prescription calling for capsules, pills and tablets?
10. What percentage of total drug store volume consisted of liquor prescriptions?
11. Does prescription volume take a drop in summer months?
12. Are prescription prices lower in professional pharmacies than in the usual commercial type drug store?
13. Have pharmacists increased their prescription prices during the past twenty years?
14. What is the actual cost to the pharmacist of the ingredients in various types of prescriptions?
15. Has the tendency of physicians during the past twenty years been to prescribe specialties more than U. S. P. and N. F. preparations?
16. To what extent do pharmacists detail physicians?
17. Are the physicians who have graduated in recent years inclined to prescribe a different type of ingredients from those who began to practice before the War?
18. How many new drug stores open every year?
19. What is the maximum number of different ingredients required to fill 10,000 prescriptions?
20. How would these be divided between chemicals, galenicals and specialties?
21. How many would be called for as many as 10 times each per 10,000 prescriptions?
22. How many prescription department items distributed judiciously among chemicals, galenicals and manufacturers' specialties should prove to be an adequate opening order, and what would be their cost?
23. How many different ingredients are required to fill the first 500 prescriptions and how many for each succeeding block of 500?
24. How many prescriptions per day does the average drug store fill the first year in business?

25. Does prescription volume become greater as drug stores grow older?

26. What percentage of prescriptions filled are private formula prescriptions?

27. What type of practitioner tends to write the bulk of private formula prescriptions?

28. What percentage of the total number of items stocked in a prescription department have no movements in the course of a year?

29. Of those items without movement, how many were chemicals, galenicals, specialties, etc.?

30. How many new manufacturers' specialties have been introduced in the past few years and what is the extent of their use in prescriptions?

31. To what extent do physicians specify a particular brand when prescribing galenicals?

32. What are the leading chemicals, galenicals, specialties, etc., from the point of view of their demand in prescriptions?

Space will not permit, in an article of this length, the enumeration of more than a few of the facts brought to light in the professional phase of the National Drug Store Survey. Therefore, in this article only those facts which are believed to be of special interest to manufacturers will be mentioned. Answers to all of the above questions, and many more which may come to mind, will be found in "The Professional Pharmacy," the second report on the prescription department phases of the National Drug Store Survey.

We are taking the liberty of quoting from a review in the following:

"The value of the information contained in this report is not believed to be confined to the proprietors of professional pharmacies. It contains much information which should be of practical value to the proprietors of commercial-type drug stores, in increasing their volume of prescription business and the profit possibilities of their prescription departments. Professors and students in colleges of pharmacy may find herein answers to some of the questions about which there has been conjecture. Drug wholesalers and manufacturers of chemicals, galenicals and pharmaceutical specialties should find the list of leading ingredients, which was compiled after an analysis of 20,000 prescriptions, of particular interest. Pharmacists who are contemplating the operation of a professional pharmacy will find certain information particularly directed to them. It is hoped, therefore, that all branches of the drug profession and trade will be in some way aided by the information presented in this report."

Reprints of "Professional Pharmacy" will be bound in paper cover at 25 cents per copy; 10 per cent discount in quantities of 6 or more and 20 per cent discount in quantities of 100 or more; 1000 or more, 25 per cent discount.

It is assumed that every drug store in the United States, as well as in other countries, will want one or more copies; wholesalers and manufacturers will want a larger number. It is assumed the schools of pharmacy will desire the publication for their students. Requests should be made promptly, as it is contemplated to give the order for the reprints as soon as a sufficient number are ordered. If sufficient orders are received to warrant such binding, reprints in buckram will be supplied at $1 per copy.

COMMERCE DEPARTMENT CONTINUES SERVICES.

Services to the drug trade will be continued in 1934, according to C. C. Concannon, Chief of the Chemical Division, Bureau of Foreign and Domestic Commerce, Washington, D. C. These services include a weekly *bulletin* which gives news of the world affecting the drug trade of the United States. The export publications cover shipments of medicinal oils, biologics, pharmaceuticals, proprietary medicines, toilet preparations, crude drugs, etc. Import publications detail receipts of crude drugs, miscellaneous chemicals and perfumery. All these statements show quantity and value as well as countries of origin and destination. The statement of imports for consumption covers the entire field of drugs, chemicals, dyes, plastics, etc. The weekly "World Trade Notes," issued each Monday, contains an average of 40 news items gathered from all parts of the world, together with a list of foreign trade opportunities received during the preceding week.

Mr. Concannon will be pleased to forward free sample copies of any of the Division's publications.

Benjamin E. Holsendorf has been appointed and commissioned as Passed Assistant-Pharmacist with the grade of Passed Assistant-Surgeon in the Regular Corps of the U. S. Public Health Service.

EDITORIAL NOTES

Because of Association Reports, which required many pages, publication of a number of papers and items in this Section had to be deferred.

A CORRECTION.

Mrs. Rebecca R. Reese, a grand-niece of Dr. Richard H. Stabler, a former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, has called attention to two errors in the Historian's Report, on page 1192 of the November JOURNAL, 5th paragraph. Richard H. Stabler, referred to, was *not* a partner, in the Stabler pharmacy but was owner of the store on the corner of King and Washington Sts., still maintained as a drug store by J. E. W. Timberman, Alexandria. The William Stabler referred to was Dr. Richard Stabler's half-brother; the former was a son of Edward Stabler by his first wife, Mary Pleasants; Richard H. was the son of Edward Stabler and his second wife, Mary Hartshorne Stabler.

Mrs. Reese is chairman of the Executive Committee of the Association for the Preservation of Alexandria Antiquities, a purpose of the organization is to raise funds for purchasing the building in which the pharmacy of Edward Stabler, afterward Leadbeater pharmacy, was established and preserve the old apothecary shop as a museum.

UNITED STATES CIVIL SERVICE EXAMINATIONS.

The United States Civil Service Commission announces the following-named open competitive examinations for

TOXICOLOGIST POSITIONS.

Applications for toxicologist positions of various grades must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than January 11, 1934. At present there is a vacancy in the position of assistant toxicologist in the Bureau of Chemistry and Soils, Department of Agriculture, with headquarters in San Francisco, Calif. The entrance salary for assistant toxicologist ranges from $2600 to $3200 a year. Entrance salaries for all grades covered by the examination range from $2600 to $5400 a year, less a deduction of not to exceed 15 per cent as a measure of economy and a retirement deduction of $3\frac{1}{2}$ per cent.

Competitors will not be required to report for a written examination, but will be rated on their education and experience. Certain specified education and experience are required.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city, or from the United States Civil Service Commission, Washington, D. C.

COMMENT IN NATIONAL RECOVERY ADMINISTRATION, RETAIL BULLETIN NO. 1.

The terms "registered pharmacist," "assistant pharmacist" and "apprentice pharmacist," as used herein (Code) shall have the meaning given to them under the laws of the respective states of the United States and of Alaska.

A worker to be classified in this group must comply with the state law requirements for his position. The separate classification of pharmacists and professional persons is not intended to reflect in any way upon the recognized standing of pharmacists.

THE CENTENARY OF THE DISCOVERY OF DIASTASE.

The present year represents the centenary of the discovery of diastase, an incident of great importance for the biologic sciences and not without considerable significance for medicine. In 1830, Dubrunfaut prepared an extract of malt that converted starch into sugar just as since early in the nineteenth century strong acids were known to do. His paper was really the first account of the action of an enzyme in solution. Three years later, in 1833, Payen and Persoz precipitated by alcohol from such extracts a substance that could be dried and preserved and that had a powerful action on starch. This they called "diastase." The term has continued in use in France almost to the present time as synonymous for the substances more commonly designated to-day as enzymes. Of course, the production of sugar in the process of malting was known before 1833; but the modern scientific history of enzymes and their action really commences with the researches of Payen and Persoz on diastase.

To-day, at a time when enzymes seem to be recognized to a greater extent than ever be-

fore as possible potent agents in the biologic process of disease as well as of health, it may seem worth while to recall a few of the steps that have led to the current interest in those unusual specific biochemical catalysts that are termed enzymes. In the early period, as the number of recognized diastase-like products grew, they were designated in general as "ferments" on account of similarities in their activities to those of alcoholic fermentation. Presently substances of the diastase type were distinguished as "soluble" or "unorganized" ferments in contradistinction to living organisms, like yeast, to which the name "organized ferments" was then applied. The inevitable confusion led the Heidelberg physiologist, Kühne, in 1878 to suggest a new name. The publication in which this first occurred is so rare, and so few students have actually read it, that we venture to repeat the interesting passage, in translation:

"The latter designation (*i. e.*, formed and unformed ferments) has not gained general acceptance, in that on the one hand it was objected that chemical bodies such as ptyalin and pepsin could not be called ferments, since the name was already given to yeast cells and other organisms (Brücke); while on the other hand it was said that yeast cells could not be called ferments, because then all organisms, including man, would have to be so designated (Hoppe-Seyler). Without stopping to inquire further why the name excited so much opposition, I have taken the opportunity to suggest a new one, and I give the name enzymes to some of the better known substances, called by many 'unformed ferments.' This is not intended to imply any particular hypothesis, but it merely states that (in yeast) something occurs that exerts this or that activity, which is considered to belong to the class called fermentative. The name is not, however, intended to be limited to the invertin of yeast, but it is intended to imply that more complex organisms, from which the enzymes, pepsin, trypsin, etc., can be obtained, are not so fundamentally different from the unicellular organisms as some people would have us believe."—*Journal A. M. A.*, November 11, 1933.

THE NATIONAL DRUG TRADE CONFERENCE.

In an editorial of this issue of the JOURNAL the part of the AMERICAN PHARMACEUTICAL ASSOCIATION in food and drug legislation is discussed.

The National Drug Trade Conference met in annual session in Washington, December 5th, at which time a special committee was appointed on the revision of the Food and Drugs Act consisting of J. H. Beal, chairman, R. L. Swain, W. Bruce Philip, H. W. Bigelow, H. B. Thompson, J. G. Beard, W. L. Crounse, R. E. L. Williamson, Harry Noonan, representing the constituent associations of the Conference.

Chairman J. H. Beal later presented an analysis of the Copeland Bill (S. 1944) A draft of suggested amendments—to amend the Food and Drugs Act, June 30, 1906, as amended August 23, 1912, March 3, 1913, July 24, 1919, January 18, 1927, and July 8, 1930—was offered in connection with the statements of Chairman Beal before the Sub-Committee of the Senate Committee on Commerce, December 7, 1933. (At this hearing Walter G. Campbell, Chief of the Food and Drug Administration explained the Copeland Bill. The hearing is being printed and copies may be had by addressing your Congressman or Senator.)

Complete reports of the sessions of the Drug Trade Conference—containing the statements of Chairman Beal, suggested amendments, with discussions at the hearing—have been given to the press by the National Drug Trade Conference. It should be stated that the discussions and actions on this important matter, participated in by the members, representing the phases of pharmacy and the drug trade, were outstanding subjects of the meeting. The effect of the foregoing at the hearing is expressed by statements of Senator Copeland that the bill will be revised in many particulars. As stated, the bill under discussion was S. 1944, introduced by the latter and popularly known as the "Tugwell Bill." The progress of this important legislation will be reported in succeeding issues of the JOURNAL.

James H. Beal reported that revisions are in preparation of the table of potent and toxic drugs. Reprints of the table are available, having been reprinted by the AMERICAN PHARMACEUTICAL ASSOCIATION.

President R. L. Swain reported for the committee on the general status of pharmacy and the drug trade. He recognized that the present offered an outstanding opportunity for cooperation and advised readjustment in keeping with NRA purposes. He also reported on the study of prescription tolerances.

Progress was reported in simplification of glass containers, enactment of state narcotic laws; greater efforts in securing endowments for pharmaceutical research was urged.

"The conference reaffirmed its approval of the principle of the bills designed to legalize price-maintenance contracts. The position of the Conference with respect to improvement in the status of pharmacists in the army was also reaffirmed. H. C. Christensen presented a detailed report of the pharmacal exhibit at the Chicago 'Century of Progress' exposition. The Conference thanked Mr. Christensen and gave approval to his suggestion that an effort be made to have a similar exhibit at the repeated fair next year. The value of the exhibit in respect to public relations was attested by several members."

The following officers were elected for the ensuing year:

President, Carson P. Frailey, Washington, American Drug Manufacturers' Association.

Vice-President, A. C. Taylor, Washington, National Association of Boards of Pharmacy.

Secretary-Treasurer, E. F. Kelly, Washington, AMERICAN PHARMACEUTICAL ASSOCIATION.

Councilor in the Chamber of Commerce of the United States, S. L. Hilton, Washington.

Members of the Executive Committee: W. B. Philip, National Association of Retail Druggists; W. L. Crounse, National Wholesale Druggists' Association; Harry Noonan, American Pharmaceutical Manufacturers' Association; J. G. Beard, American Association of Colleges of Pharmacy; P. I. Heuisler, Proprietary Association; R. E. Lee Williamson, Federal Wholesale Druggists' Association.

E. L. Newcomb says—"there never was a time when there was a greater need for pharmacists to emphasize their professional service. If they do not do this effectively, they are sure to be engulfed in the commercial maelstrom which has completely disrupted every normal activity in this country. Pharmacy has got to fight for its preservation."

OBITUARY.

JOSEPH W. ENGLAND.

Joseph Winters England, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1893, died in Atlantic City, December 2nd, aged 72 years. He was born in Philadelphia, a son of Robert and Louisa R. England. His paternal forebears were of Swedish descent, settling at Swedesboro, N. J., in 1682; his mother's ancestors were Huguenots from Alsace, France, who settled among the Pennsylvania Germans in Lancaster County, in 1728. His father was a well and favorably known pharmacist of Philadelphia.

JOSEPH W. ENGLAND.

Joseph W. England was educated in the Philadelphia public schools and learned the retail drug business in his father's pharmacy. He graduated from the Philadelphia College of Pharmacy in 1883, winning the Henry C. Lea prize for the most meritorious thesis (on *Myrtus Cheken*) of his class. He studied medicine at the University of Pennsylvania and, in 1886, was elected Chief Druggist of the Philadelphia Hospital (Department of Charities and Correction).

In 1900, he became head of the pharmaceutical department of H. K. Mulford Company; in 1902, he resigned to accept the position as consulting pharmacist to Smith, Kline and French Company, and served as director of its Research Laboratory until his demise.

He was widely known for his researches, which covered a broad field in pharmacy and contributed many original articles to pharmaceutical organizations and publications; he was editor of the historical volume of 728 pages.

—"First Century of the Philadelphia College of Pharmacy." From 1891 to 1901, he was editor of the *Alumni Report*, and served as member of the publication committee of the *American Journal of Pharmacy* from 1893 until his death.

Mr. England, soon after graduation, took an active and continued interest in the affairs of his *Alma Mater*. He served as curator of the Museum from 1887 to 1920, was member of the board of trustees from 1892, and chairman of the board during the later years of his life; he was secretary of the Alumni Association from 1904, having served as president in 1891–1892.

In 1926 he was honored with the presidency of Pennsylvania Pharmaceutical Association. In 1910, he was elected to the Committee of Revision of the United States Pharmacopœia and served on three sub-committees. From 1912–1933, he was secretary of the Philadelphia Drug Exchange.

In 1901, Mr. England was elected secretary of the Section on Scientific Papers, A. PH. A.; in 1905, secretary of the Section on Education and Legislation and in 1907, its chairman. From 1909–1920, he was secretary of the Council; served as acting-editor of the *Bulletin*, 1910–1911, and was active in establishing the JOURNAL OF THE A. PH. A., chairman of the committee on publications until 1920; he served on the Committee of Revision of the National Formulary for many years. He took an active part in the organization of the Philadelphia Branch, A. PH. A., and served as its president in 1921–1922. In 1903, his *Alma Mater* conferred on him the degree of Master in Pharmacy; in 1904, he was elected member of the American Medical Association.

The deceased gave many years of faithful and diligent service to the AMERICAN PHARMACEUTICAL ASSOCIATION and to the advancement of American pharmacy.

His wife, Mrs. Ella Virginia England, and a daughter, Elizabeth Russell England, survive. The obsequies, on December 5th, were largely attended by members of the pharmaceutical and medical professions and of the drug-trade activities.

JOSEPH L. MAYER.

Joseph L. Mayer, chief chemist of the Louis K. Liggett Co. for more than 20 years, and head of the Chemistry Department of the Brooklyn College of Pharmacy, died suddenly December 1st, of a heart attack, at the age of fifty-eight.

Professor Mayer began work as a pharmacist as a drug clerk, and was later chief chemist for the Hegeman Co. and the Riker-Hegeman Co. For thirty-five years he was connected with the Brooklyn College of Pharmacy, as instructor and professor of analytical chemistry. Doctor Mayer was the author of many scientific articles, and had served as a member of the board of examiners of the New York Health Department. He was a member of the American Chemical Society and of the AMERICAN PHARMACEUTICAL ASSOCIATION, since 1905.

JAMES A. YATES.

James Anderson Yates, head of the Department of Chemistry and Physics of the Kansas State Teachers College, Pittsburg, Kans., died November 12, 1933. Doctor Yates was born in Laurel County, Ky., on October 24, 1865. He was in charge of science work at Ottawa University, Ottawa, Kans., from 1897 to 1907, when he took charge of a similar department at Pittsburg, and continued there until the time of his death. He received the degrees of B.S., M.S. and Ph.D., from the University of Kentucky.

Doctor Yates had been a member of the American Chemical Society and of the AMERICAN PHARMACEUTICAL ASSOCIATION, since 1923.

ROBERT SIMPSON.

We are advised of the death of Robert Simpson, pharmacist, at 201 North 36th St., Philadelphia, where he located soon after his graduation from the Philadelphia College of Pharmacy, in 1883. He had been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION, since 1913.

Moses Kahn, for more than forty years engaged in the retail drug business and one of the most prominent members of the profession in Baltimore, died November 26th at his home in the Esplanade Apartments, of heart trouble. He was seventy-four years old and retired about four years ago, at which time his place at Liberty and Lexington streets was taken over by the Read Drug and Chemical Company. Mr. Kahn was a member of the Maryland Pharmaceutical Association and of the Baltimore Veteran Druggists' Association, and aided in the promulgation of all movements designed to advance the interests as well as raise the ethics of the profession. His wife and a son survive.

BOOK NOTICES AND REVIEWS.

Erkennung Organischer Verbindungen in besondern von Arzneimitteln (Recognition of Organic Compounds, in Particular of Medicinal Agents) by DR. LAD. EKKERT, Leiter des Pharmaceutisch - Chemischen Laboratoriums im I. Chemischen Institute der Königlich Ungarischen Petrus-Pázmàny Universität zu Budapest. Verlag von Ferdinand Enke in Stuttgart, 1933. 184 pages, price in paper cover, Rm. 16.00, price bound, Rm. 17.60.

This book comprises Vol. 32 of the extended work, "Die Chemische Analyse," established by the late Dr. B. M. Margosches and now edited by Dr. Wilhelm Böttger. The contents of the book consist of descriptions of and qualitative tests for the detection and identification of 191 organic chemicals used as medicinal agents. These substances are arranged alphabetically according to their German names and are treated in monographic style. Under each chemical, there is given information concerning its description and properties, such as color, taste, crystalline form, melting point, boiling point, optical rotation, solubilities, etc., and numerous qualitative tests. The limited size of the book made necessary a selection of the tests to be included. Many common or frequently recurring tests are referred to by their author's names. Citations of the original literature are given throughout the work. Some concept of the nature and diversity of the materials considered and out of the number of tests and literature citations may be obtainable from the following items selected as representative: Apomorphine, 7 tests, 9 references; Cholesterin, Ergosterin and Phytosterin, 20 tests, 15 references; Gallic Acid, 9 tests, 10 references; Novocaine, 7 tests, 9 references; Phenyldimethylpyrazolon, 7 tests, 11 references; Glucose, 11 tests, 31 references; g-strophanthin, 4 tests, 7 references; Novatropine, 8 tests, 2 references. In each of the tests, sufficient procedure is given for their performance and in many of them, the limit of sensitivity is indicated. Many of the tests presented were developed by the Author in the course of a number of years of work on the revision of the chemical monographs for the Hungarian Pharmacopœia III. Many other well-known tests as well as new tests reported in the journals have been studied and improved.

The book should be a valuable reference work for all who are engaged in the revision of the organic chemical monographs for the United States Pharmacopœia and National Formulary. It should also be of value in all laboratories where the detection and identification of organic medicinal agents are studied.—GLENN L. JENKINS.

Proceedings of the National Conference on Pharmaceutical Research. This publication of 100 pages records Pharmaceutical Research achievements in the profession of pharmacy; also contains the minutes of the meeting in Madison, August 26, 1933. The reports of the Standing Committees on Dispensing, Manufacturing, Medicinal, Chemical, Pharmacognosy, Pharmacology and Bioassays, Bacteriology and Biology, Physical Chemistry, Educational Methods, Pharmaceutical Economics, and Historical Pharmacy give useful data for pharmacists.

Table No. 1 lists reports of pharmaceutical research in laboratories, and Table No. 2 that of specific scientific research, together with names of contributors and authors. The titles are indicative of the valuable information contained in this publication and serve as a reference to many subjects; the matter is well arranged and the printing commends the author and compiler. The secretary of the National Conference on Pharmaceutical Research is Dr. John C. Krantz, Jr., 2411 N. Charles St., Baltimore, Md.

Dean, F. J. Wulling gave to the museum of the University of Minnesota the prescription balance and microscope he won as prizes for scholarship when he graduated from the Columbia University College of Pharmacy, in 1887. He donated also the student lamp used by him in his student days.

The Minnesota State Pharmaceutical Association celebrates its Golden Anniversary, February 13th–16th. The celebration will be in the nature of a homecoming for national figures whose earlier training was secured under association auspices—Dr. E. L. Newcomb, secretary and executive vice-president of the National Wholesale Druggists' Association, and John W. Dargavel, secretary of the National Association of Retail Druggists, will be among the speakers.

Tuesday evening, November 28th, approximately 300 friends of John W. Dargavel, recently elected secretary of the N. A. R. D., gave a dinner in his honor at the Hotel Nicollet, Minneapolis.

PLASTIC TOPS FOR MERCK'S FINE PRESCRIPTION CHEMICALS

. . . . Afford protection against dirt and dust entering bottle.

. . . . Remove easier than corks — do not stick.

. . . . Improve appearance of the package.

Practically all Merck ℞ Chemicals marketed in wide mouth cork-stoppered bottles will be changed to this new type package just as soon as supplies and production permit. Many are now available through your wholesaler.

MERCK & CO. INC.

Manufacturing Chemists

Rahway, N. J.

AMERICAN PHARMACEUTICAL ASSOCIATION
OFFICIAL ROSTER FOR 1933–1934

(Committees will be corrected as appointments are made by the President, A. PH. A., and Chairman of the Council, A. PH. A., Chairman of the House of Delegates, Chairmen of the Sections.)

OFFICERS OF THE ASSOCIATION.

President, R. L. Swain, 2411 No. Charles St., Baltimore.
Honorary President, Edward Kremers, Madison, Wis.
First Vice-President, Robert P. Fischelis, P. O. Box 158, Trenton, N. J.
Second Vice-President, John C. Krantz, Jr., 2411 No. Charles St., Baltimore, Md.
Secretary, E. F. Kelly, 10 W. Chase St., Baltimore, Md.
Treasurer, C. W. Holton, Box 81, Essex Fells, N. J.
Editor of the Year Book, A. G. DuMez, Lombard & Greene Sts., Baltimore, Md.
Editor of the Journal, E. G. Eberle, 10 W. Chase St., Baltimore, Md.

THE COUNCIL

Elected Members.—H. A. B. Dunning, Charles & Chase Sts., Baltimore, Md. (1934); S. L. Hilton, 1033 Twenty-Second St., N.W., Washington, D. C. (1934); Ambrose Hunsberger, 1600 Spruce St., Philadelphia, Pa. (1934); J. H. Beal, Fort Walton, Fla. (1935); C. E. Caspari, Euclid & Parkview Aves., St. Louis, Mo. (1935); C. H. LaWall, 214 S. 12th St., Philadelphia, Pa. (1935); H. V. Arny, 115 W. 68th St., New York, N. Y. (1936); H. C. Christensen, 130 No. Wells St., Chicago, Ill. (1936); Walter D. Adams, Forney, Texas (1936).

Ex-Officio Members.—R. L. Swain, 2411 No. Charles St., Baltimore, Md.; Robert P. Fischelis, P. O. Box 158, Trenton, N. J.; John C. Krantz, Jr., 2411 No. Charles St., Baltimore, Md.; E. F. Kelly, 10 W. Chase St., Baltimore, Md.; C. W. Holton, Box 81, Essex Fells, N. J.; P. H. Costello, Cooperstown, N. Dak.; A. G. DuMez, Lombard & Greene Sts., Baltimore, Md.; E. G. Eberle, 10 W. Chase St., Baltimore, Md.

OFFICERS OF THE COUNCIL.

Chairman, S. L. Hilton, 1033—22nd St., N.W., Washington, D. C.; *Vice-Chairman*, Charles H. LaWall, 214 S. 12th St., Philadelphia, Pa.; *Secretary*, E. F. Kelly, 10 W. Chase St., Baltimore, Md.

COMMITTEES OF THE COUNCIL.

Committee on Finance.—*Chairman*, R. L. Swain, 2411 N. Charles St., Baltimore, Md.; C. H. LaWall, C. W. Holton, Essex Fells, N. J.

Committee on Property and Funds.—*Chairman*, R. L. Swain, C. W. Holton, S. L. Hilton, T. J. Bradley, E. F. Kelly.

Committee on Publications.—*Chairman*, A. G. DuMez, H. V. Arny, C. H. LaWall, Walter D. Adams, E. G. Eberle, E. F. Kelly, C. W. Holton.

Committee on Standard Program.—*Chairman*, S. L. Hilton, T. J. Bradley, E. F. Kelly.

Committee on Year Book.—*Chairman*, George D. Beal, Pittsburgh, Pa.; F. W. Nitardy, Brooklyn, N. Y.; H. W. Youngken, Boston, Mass.; E. N. Gathercoal, Chicago, Ill.; E. E. Swanson, Indianapolis, Ind.; James C. Munch, Glenolden, Pa.; J. C. Krantz, Jr., Baltimore, Md.

American Council on Pharmaceutical Education.—E. F. Kelly (1938), D. F. Jones (1936), H. A. B. Dunning (1934). These members serve with an equal number from the N. A. B. P. and the A. A. C. P.

THE HOUSE OF DELEGATES.

Officers of the House.—*Chairman*, P. H. Costello, Cooperstown, No. Dak.; *Vice-Chairman*, S. A. Williams, Troy, Ala.; *Secretary*, E. F. Kelly, 10 W. Chase St., Baltimore, Md.

COMMITTEES OF THE HOUSE OF DELEGATES.

Place of Meeting.—*Chairman*, T. J. Bradley, Boston, Mass.; R. A. Lyman, Lincoln, Neb.; W. F. Rudd, Richmond, Va.; C. G. Merrell, Cincinnati, Ohio; John Culley, San Francisco, Calif.

Patents and Trademarks.—*Chairman*, F. E. Stewart, Philadelphia, Pa.; S. C. Henry, Chicago, Ill.; F. W. Nitardy, Brooklyn, N. Y.; W. Bruce Philip, Washington, D. C.

THE SECTIONS.

Scientific Section.—*Chairman*, F. E. Bibbins, 5840 Washington Blvd., Indianapolis, Ind.; *First Vice-Chairman*, E. V. Lynn, Seattle, Wash.; *Second Vice-Chairman*, H. M. Burlage, Chapel Hill, N. C.; *Secretary*, L. W. Rowe, c/o Parke, Davis & Co., Detroit Mich.; *Delegate to the House of Delegates*, W. J. Husa, Gainesville, Fla.

Committee on Ebert Prize.—*Chairman*, L. E. Warren, Washington, D. C.; E. E. Swanson, Indianapolis, Ind.; H. A. Langenhan, Seattle, Wash.

Board of Review of Papers.—*Chairman*, L. W. Rowe, c/o Parke, Davis and Company, Detroit, Mich.; Geo. D. Beal, Pittsburgh, Pa.; F. F. Berg, Brooklyn, N. Y.; C. O. Lee, Lafayette, Ind.; E. V Lynn Seattle, Wash.; John C. Krantz, Jr., Baltimore, Md.; Heber W Youngken, Boston, Mass.

Committee to Coöperate with the National Conference on Pharmaceutical Research.—*Chairman*, John C. Krantz, Jr., 2411 N. Charles St., Baltimore, Md.; H. M. Burlage, Chapel Hill, N. C.; W. G. Crockett, Richmond, Va.

Committee on Monographs.—*Chairman*, E. E. Swanson, c/o Eli Lilly and Co., Indianapolis, Ind.; C. J. Zufall, Lafayette, Ind.; James C. Munch, c/o Sharp & Dohme, Glenolden, Pa.; W. J. Husa, U. of Fla., Gainesville, Fla.; Heber W. Youngken, c/o Mass. College of Pharmacy, Boston, Mass.

Section on Education and Legislation.—*Chairman*, George C. Schicks, Montclair, N. J.; *Vice-Chairman*, Oscar E. Russell, Elkhart, Ind.; *Secretary*, C. W. Ballard, Mount Vernon, N. Y.; *Delegate to House of Delegates*, W. H. Rivard, Providence, R. I.

Section on Practical Pharmacy and Dispensing.—*Chairman*, M. J. Andrews, University of Maryland, Lombard and Greene Sts., Baltimore, Md.; *Vice-Chairman*, Ralph W. Clark, University of Wisconsin, Madison, Wis.; *Secretary*, R. E. Terry, School of Pharmacy, University of Illinois, 701 S. Wood St., Chicago, Ill.; *Delegate to the House of Delegates*, L. W. Rising, Newark, N. J.

Committee on Glass Standardization and the Relation of Glass to the Preservation of Pharmaceutical Preparations.—*Chairman*, H. V. Arny, 115 W. 68th St., New York, N. Y.; I. A. Becker, Chicago, Ill.; Fitzgerald Dunning, Baltimore, Md.

Section on Commercial Interests.—*Chairman*, John A. J. Funk, Galveston, Ind.; *Vice-Chairman*, Henry Brown, Scranton, Pa.; *Secretary*, Robert W. Rodman, 55 Park Ave., Bloomfield, N. J.; *Delegate to the House of Delegates*, R. B. Rothrock, Evansville, Ind.

Section of Historical Pharmacy.—*Chairman*, Louis Gershenfeld, 281 S. 63rd St., Philadelphia, Pa.; *Secretary*, C. O. Lee, Purdue University, Lafayette, Ind.; *Delegate to the House of Delegates*, J. T. Lloyd, Cincinnati, Ohio; *Historian*, E. G. Eberle, 10 W. Chase St., Baltimore, Md.

STANDING AND SPECIAL COMMITTEES OF THE ASSOCIATION.

Elected by the Council.

Committee on National Formulary.—*Chairman*, E. N. Gathercoal, Chicago, Ill.; *Vice-Chairman*, Louis Saalbach, Pittsburgh, Pa.; *Secretary*, Adley B. Nichols, Philadelphia, Pa.; Gustav Bachman, Minneapolis, Minn.; H. A. Langenhan, Seattle, Wash.; Paul S. Pittenger, Philadelphia, Pa.; Wilbur L. Scoville, Detroit, Mich.; O. A. Farwell, Detroit, Mich.; H. V. Arny, New York, N. Y.; Bernard Fantus, Chicago, Ill.; Leonard Seltzer, Detroit, Mich.; E. L. Newcomb, New York, N. Y.; S. L. Hilton, Washington, D. C.; I. A. Becker, Chicago, Ill.; Glenn L. Jenkins, Baltimore, Md. *Associate Member*, the Chairman of the Revision Committee, U. S. P.

Committee on Recipe Book.—*Chairman*, J. Leon Lascoff, New York, N. Y.; W. H. Glover, Lawrence, Mass.; F. B. Kilmer, New Brunswick, N. J.; W. L. Scoville, Detroit, Mich.; C. P. Wimmer, New York, N. Y.; R. R. Gerstner, New York, N. Y.; J. K. Thum, Philadelphia, Pa.; I. A. Becker, Chicago, Ill.; C. J. Clayton, Denver, Colo.; M. A. Davis, White Plains, N. Y.; C. M. Roehr, San Francisco, Calif.; Robert P. Fischelis, Trenton, N. J.; Bernard Fantus, Chicago, Ill.; William Gray, Chicago, Ill.; L. D. Havenhill, Lawrence, Kans.; E. Fullerton Cook, Philadelphia, Pa.; E. N. Gathercoal, Chicago, Ill.; H. L. Meredith, Fort Pierce, Fla.; Thomas Roach, Oklahoma City, Okla.; W. W. Horne, Fayetteville, N. C.; S. L. Hilton, Washington, D. C.; F. W. Nitardy, Brooklyn, N. Y.; H. A. Langenhan, Seattle, Wash.; Otto Raubenheimer, Brooklyn, N. Y.

(Continued on page xii)

OCCASIONS *in Your Everyday Practice*

Where You Have Need for **CORAMINE**, "CIBA"

The Safe and Dependable Circulatory and Respiratory Stimulant

For Literature and Samples, write to CIBA COMPANY, INC., NEW YORK, N. Y.

Publications for the Pharmacist

Year Books, A. Ph. A., $4.00.

Bound Journals, $6.00.

Single copies, 35 cents, but advanced charges must be made for earlier copies.

Prior Issues, N. F. Back Numbers of Proceedings—ask for prices.

Enlarged Picture of the Laboratory, suitable for framing, $1.00 each.

Reprints

"The Pharmacognosy, Chemistry and Pharmacology of Viburnum," by Heber W. Youngken, Part I, 24 pp. and cover, 25 cents per copy. Part II, 14 pp. without cover, 15 cents per copy.

"Phytochemical Study of Hydrastis Canadensis," Gillis and Langenhan, 29 pages, no cover, 25 cents per copy.

Report on Extent of Use of N. F. Galenicals —E. N. Gathercoal, Chairman, 14 pp., 25 cents.

Charles Rice, Sketch, 3 pp., Joseph P. Remington, Sketch, 3 pp., both for 10 cents.

"Pharmaceutical History Brought to Light by a Famous Misnamed Picture," Elsie Woodward Kassner, 11 pp., 10 cents per copy.

Ground Breaking, Pharmacy Headquarters, unmounted, 75 cents, mounted, $1.00.

Facsimile reproduction of proof sheets of U. S. P. I, 1820, bearing corrections in script by Dr. Elisha De Butts and a note from Dr. Lyman Spalding to Dr. De Butts, 40 pages, bound in heavy paper cover 5½ by 9 inches. Price $3.00 postpaid.

"A Half Century of the National Formulary" —English names, titles, synonyms, etc., 100 pp., paper cover, $1.00.

"Reciprocity Explained," 5 cents per copy.

"Prerequisite Legislation," 5 cents per copy.

"The Pharmacology of Ergot: with Particular Respect to Its Biological Assay and Standardization" (19 pages), by Marvin R. Thompson, Parts I–III, 25 cents per copy, Parts IV, V and VI, 20 cents, Parts VII–IX, 35 cents per copy.

"Professional Pharmacy"—an Address, by Dean C. B. Jordan, 10 cents per copy.

"Syrup of Ferrous Iodide and the Official Hydriodic Preparations," paper cover, 20 cents per copy.

"A Pharmaceutic Study of Magma Magnesiae—1900–1930," paper cover, 25 cents per copy.

"A Literature Review on the Production of Antirachitic Substances by Irradiation Process," paper cover, 25 cents per copy.

Others to follow.

Order from

American Pharmaceutical Association

10 West Chase St., BALTIMORE, MD.

(Continued from page x)

Committee on Pharmaceutical Research.—W. J. Husa, Gainesville, Fla. (1934); George D. Beal, Pittsburgh, Pa. (1934); W. L. Scoville, Detroit, Mich. (1935); John C. Krantz, Jr., 2411 N. Charles St., Baltimore, Md. (1935); H. W. Youngken, Boston, Mass. (1936); J. C. Munch, c/o Sharp & Dohme, Glenolden, Pa. (1936); J. A. Koch, Pittsburgh, Pa. (1937); Glenn L. Jenkins, Baltimore, Md. (1937); *Chairman*, H. V. Arny, New York, N. Y. (1938); C. H. LaWall, Philadelphia, Pa. (1938). *Associate Members*, E. F. Cook, Philadelphia, Pa.; E. N. Gathercoal, Chicago, Ill.; L. E. Warren, Washington, D. C.; E. F. Kelly, Baltimore, Md.; C. W. Holton, Essex Fells, N. J.

Committee on Proprietary Medicines.—*Chairman*, J. H. Beal, Camp Walton, Fla. (1935); S. C. Henry, Chicago, Ill. (1934); W. B. Day, Chicago, Ill. (1936); S. L. Hilton, Washington, D. C. (1937); C. E. Caspari, St. Louis, Mo. (1938).

Appointed by the President.

Committee on the Study of Pharmacy.—E. F. Kelly, Baltimore, Md.; W. W Horne, Fayetteville, N. C.; H. A B. Dunning, Baltimore, Md.

Committee on Cosmetics.—*Chairman*, Charles H. LaWall, Philadelphia, Pa.; A. G. DuMez, Baltimore, Md.; George D. Beal, Pittsburgh, Pa.; F. W. Nitardy, Brooklyn, N. Y.; Bernard Fantus, Chicago, Ill.

Committee on Local Branches.—*Chairman*, C. Leonard O'Connell, Pittsburgh, Pa.; A. O. Mickelsen, Portland, Ore.; B. A. Bialk, Detroit, Mich.; F. H Eby, Springfield, Pa.; C. V. Netz, Minneapolis, Minn.; Edward Spease, Cleveland, Ohio; E. R. Serles, Brookings, S. Dak.; H. C. Kassner, New York, N. Y.

Board of Canvassers.—*Chairman*, W. F. Rudd, Richmond, Va.; A. L. I Winne, Richmond, Va.; W. G. Crockett, Richmond, Va.

Committee on Legislation.—*Chairman*, A. V. Burdine, Washington, D. C.; John F. O'Brien, Rochester, N. Y.; R. W. Clark, Madison, Wis.; C. E. Wilson, Corinth, Miss.; P. R. Loveland, Atlantic City, N. J.; R. E. Lee Williamson, Baltimore, Md.

Committee on U. S. Pharmacopœia.—*Chairman*, L. F. Kebler, Washington, D. C. (1938); Arno Viehoever, Philadelphia, Pa. (1931); H. A. B. Dunning, Baltimore, Md. (1932); H. H. Rusby, New York, N Y (1933); W. B. Philip, Washington, D. C. (1934); Theodore F. Hagenow, St. Louis, Mo. (1935); Reid Hunt, Boston, Mass. (1936); C. J. Clayton, Denver, Colo. (1937); E. N. Gathercoal, Chicago, Ill. (1939); E. Fullerton Cook, Philadelphia, Pa. (1940).

Committee on Pharmaceutical Syllabus.—E. G. Eberle, Baltimore, Md. (1934); E. R. Serles, Brookings, S. Dak. (1935); R. A. Lyman, Lincoln, Neb. (1936); Glenn L. Jenkins, Baltimore, Md. (1937); H. M. Burlage, Chapel Hill, N. C. (1938); H. C. Muldoon, Pittsburgh, Pa. (1939); Emerson D. Stanley, Madison, Wis. (1940). These members serve with an equal number from the N. A. B. P. and the A. A. C. P. each.

Committee on Pharmacy Week.—*Chairman*, Anton Hogstad, Jr., 161 Sixth Ave., New York, N. Y.; F. B. Kilmer, New Brunswick, N. J.; John O'Brien, Omaha, Nebr.; Roy S. Warnack, Los Angeles, Calif.; L. M. Kantner, Baltimore, Md.; E. J. Ireland, Madison, Wis.; Frank B. Kirby, North Chicago, Ill.

Committee on Horticultural Nomenclature.—*Chairman*, H. W. Youngken, Boston, Mass.; C. W. Ballard, New York, N. Y.; E. N. Gathercoal, Chicago, Ill.

Committee on Physiological Testing.—*Chairman*, James C. Munch, c/o Sharp & Dohme, Glenolden, Pa.; Wm. T. McClosky, Washington, D. C.; L. W. Rowe, Detroit, Mich.; C. A. Morrell, Ottawa, Can.; E. E. Swanson, Indianapolis, Ind.; M. R. Thompson, Baltimore, Md.; H. B. Haag, Richmond, Va.

Committee on Weights and Measures.—*Chairman*, R. P. Fischelis, Trenton, N. J.; W. Mac Childs, Eldorado, Kans.; Rowland Jones, Gettysburg, S. Dak.; H. W. Parker, Jonesboro, Ark.; Chas. S. Pierce, Springvale, Me.

Committee on William Procter, Jr., Memorial Fund.—*Chairman*, James E. Hancock, Baltimore, Md.; A. R. L. Dohme, Baltimore, Md.; B. T. Fairchild, New York, N. Y.; E. G. Eberle, Baltimore, Md.; D. M. R. Culbreth, Baltimore, Md.; Henry T. Hopkins, Keyport, N. J.; W. B. Day, Chicago, Ill.; J. W. England, Philadelphia, Pa.; J. K. Lilly, Indianapolis, Ind.; H. S. Wellcome, London, England; Charles G. Merrell, Cincinnati, Ohio; José P. Alacan, Havana, Cuba; C. H. Packard, Boston, Mass.; R. L. Quigley, Washington, D. C.

Committee on International Pharmaceutical Nomenclature.—*Chairman* A. G. DuMez, Baltimore, Md.; Otto Raubenheimer, Brooklyn, N. Y.; H. W. Youngken, Boston, Mass.; Arno Viehoever, Philadelphia, Pa.; Horatio C. Wood, Philadelphia, Pa.

Committee on Publicity.—*Chairman*, Robert P. Fischelis, Trenton, N. J.; H. V. Arny, New York, N. Y.; Edwin L. Newcomb, New York, N. Y.; E. C. Philips, Big Spring, Tex.; Ambrose Hunsberger, Philadelphia, Pa. To be revised.

Committee to Coöperate with Committees from the A. A. C. P. and N. A. B. P. to Obtain Pre-requisite Legislation.—*Chairman*, C. B. Jordan, Lafayette, Ind.; W. B. Day, Chicago, Ill.; Carl G. A. Harring, Boston, Mass.; H. E. Kendig, Philadelphia, Pa.

Committee on Endowment Fund.—*Chairman*, J. H. Beal, Camp Walton, Fla.; C. O. Bigelow, New York, N. Y.; Wm. B. Day, Chicago, Ill.; Theodore J. Bradley, Boston, Mass.; F. W. Sultan, St. Louis, Mo.

Campaign Committee A. Ph. A. Headquarters Building.—*Chairman*, H. A. B. Dunning, Baltimore, Md.; E. F. Kelly, S. L. Hilton, E. L. Newcomb, W. Bruce Philip, A. G. DuMez, E. G. Eberle; *Publicity Director*, E. L. Newcomb; *Director of Propaganda*, A. M. Hayes; *Business Manager*, F. C. Bortner; *Treasurer*, E. F. Kelly and State Chairmen.

Committee on Site, A. Ph. A. Headquarters Building.—*Chairman*, H. A. B. Dunning, Baltimore, Md.; C. H. LaWall, Philadelphia, Pa.; E. G. Eberle, Baltimore, Md.; M. G. Gibbs, Washington, D. C.; E. F. Kelly, Baltimore, Md.

Committee on Plans, A. Ph. A. Headquarters Building.—*Chairman*, H. A. B. Dunning, Baltimore, Md.; J. H. Beal, Camp Walton, Fla.; A. G. DuMez, Baltimore, Md.; E. L Newcomb, New York, N. Y.; E. F Kelly, Baltimore, Md.

Committee on Pharmacy Corps in the U. S. Army.—*Chairman*, R. L. Swain, Baltimore, Md.; A. L. I. Winne, Richmond, Va.; S. L. Hilton, Washington, D. C.; A. R. Bliss, Jr., Memphis, Tenn.; Thomas Roach, Oklahoma City, Okla.; George Judisch, Ames, Iowa; Edward Spease, Cleveland, Ohio; Rowland Jones, Gettysburg, S. Dak.; A. L. Phelps, Phoenix, Arizona; E. D. Oslin, Little Rock, Ark.; L. C. Brenner, Gonzales, Texas. To be revised.

Committee on Transportation.—*Chairman*, T. J. Bradley, Boston, Mass.; A. R. Bliss, Memphis, Tenn.; C. J. Clayton, Denver, Colo.; W. H. Cousins, Dallas, Texas; John Culley, San Francisco, Cal.; E. N. Gathercoal, Chicago, Ill.; C. C. Glover, Ann Arbor, Mich.; J. J. Grasser, New Orleans, La.; W. J. Husa, Gainesville, Fla.; D. B. R. Johnson, Norman, Okla.; C. E. F. Mollett, Missoula, Mont.; H. C. Newton, Omaha, Neb.; A. B. Nichols, Philadelphia, Pa.; A. W. Pauley, St. Louis, Mo.; R. C. Reese, Topeka, Kan.; H. H. Schaefer, New York, N. Y.; E. R. Serles, Brookings, S. D.; Edward Spease, Cleveland, Ohio; L. E. Warren, Washington, D. C.; W. H. Zeigler, Charleston, S. C.; Adolf Ziefle, Corvallis, Ore. To be revised.

International Pharmaceutical Federation.—*Delegates*, C. Leonard O'Connell, Pittsburgh, Pa.; W. L. Scoville, Detroit, Mich.; E. F. Cook, Philadelphia, Pa.; *Reporters*, E. G. Eberle, Baltimore, Md.; W. H. Cousins, Dallas, Tex.; Otto Raubenheimer, Brooklyn, N. Y.

American Association for the Advancement of Science.—J. C. Krantz, Jr., Councilor.

National Drug Trade Conference Delegates.—J. H. Beal, S. L. Hilton, E. F. Kelly.

Committee on Prescription Tolerances.—*Chairman*, H. H. Schaefer, New York, N. Y., F. L. Block, Baltimore, Md.; R. E. Terry, Chicago, Ill.; S. L. Hilton, Washington, D. C.; L. A. Brown, Lexington, Ky.; R. W. Fleming, Reno, Nev.; W. F. Gidley, Austin, Texas; W. F. Meads, Des Moines, Iowa.

(Continued on page xiii)

Reprints of "Professional Pharmacy," paper cover, should be ordered by early mail. See page 800, August JOURNAL, for prices.

Mention the Journal of the A. Ph. A. when writing advertisers—It identifies you.

GENERAL MEMBERSHIP COMMITTEE.

Chairman, E. F. Kelly, 10 W. Chase St., Baltimore, Md.

Boards of Pharmacy.—*Chairman*, L. L. Walton, Williamsport, Pa.; H. T. Gilbert, Noroton, Conn.; A. H. King, Delphos, Ohio.

Food and Drug Chemists.—*Chairman*, James C. Munch, c/o Sharp & Dohme, Glenolden, Pa.; C. O. Ewing, Boston, Mass.; J. L. Mayer, New York, N. Y.; E. S. Rose, Iowa City, Iowa; A. R. Maas, Los Angeles, Calif.

Wholesale Druggists and Manufacturers.—*Chairman*, H. D. Faxon, Kansas City, Mo.; E. F. Kemp, Washington, D. C.; T. S. Donaldson, Wilmington, Del.; C. G. Merrell, Cincinnati, Ohio; R. E. L. Williamson, Baltimore, Md.; F. C. Groover, Jacksonville, Fla.

Schools and Colleges of Pharmacy.—*Chairman*, L. E. Havenhill, Lawrence, Kans.; C. H. LaWall, Philadelphia, Pa.; Alice E. Garvin, New Haven, Conn.; R. A. Kuever, Iowa City, Iowa; P. H. Dirstine, Pullman, Wash.

DISTRICT NO. 1.—*Chairman*, C. H. Packard, 46 Maverick Sq., East Boston, Mass. Including Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island.

Connecticut.—*Chairman*, H. P. Bierne, New Haven; H. S. Johnson, New Haven; P. J. Garvin, New Haven; C. T. Gilbert, Noroton.

Maine.—*Chairman*, C. S. Pierce, Springvale; J. H. Dow, Portland; M. L. Porter, Danforth; G. O. Tuttle, Portland; J. H. Allen, Waterville.

Massachusetts.—*Chairman*, C. G. A. Harring, Newton Center; F. J. Amrhein, Needham; Martin E. Adamo, Boston; C. Fred Wright, Boston; T. W. Burke, Lynn; John R. Kelly, Newport.

New Hampshire.—*Chairman*, G. L. Burroughs, Hudson; G. H. Knowleton, Manchester; W. M. Norton, Portsmouth.

Rhode Island.—*Chairman*, W. H. Rivard, Providence; J. J. Gill, Providence; M. H. Corrigan, Providence.

Vermont.—*Chairman*, O. W. McShane, Poultney; Hodgdon Shaw, Bellows Falls; W. B. Eastman, St. Johnsbury; Wm. D. Kelley, North Troy.

DISTRICT NO. 2.—*Chairman*, R. P. Fischelis, 28 W. State St., Trenton, N. J. Including New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, District of Columbia.

Delaware.—*Chairman*, G. W. Rhodes, Newark; J. O. Bosley, Wilmington; H. E. Culver, Middletown; Albert Dougherty, Wilmington.

District of Columbia.—*Chairman*, W. P. Briggs, Washington; W. T. McClosky, Washington; Norman D. Parker, Washington.

Maryland.—*Chairman*, H. W. Allen, Baltimore; W. K. Edwards, Cumberland; B. Olive Cole, Baltimore; W. B. Spire, Mt. Rainier; W. C. Powell, Snow Hill.

New Jersey.—*Chairman*, Dean B. Crawford, Atlantic City; W. R. Woolley, Asbury Park; George C. Schicks, Jr., Montclair; P. R. Loveland; Atlantic City; Charles Schamach, Paterson.

New York.—*Chairman*, Frederick Schaefer, Brooklyn; John F. O'Brien, Rochester; Geo. W. Mather, Albany; H. J. Dimond, Buffalo; A. S. Wardle, Hudson.

Pennsylvania.—*Chairman*, John M. Woodside, Philadelphia; C. Leonard O'Connell, Pittsburgh; J. C. Walton, Philadelphia; J. B. Pilchard, Harrisburg; Henry Brown, Scranton.

Virginia.—*Chairman*, A. L. I. Winne, Richmond; Roy L. Crouch, Roanoke; E. P. Turner, Newport News; J. W. Williamson, Harrisonburg.

West Virginia.—*Chairman*, J. Lester Hayman, Morgantown; Roy B. Cook, Charleston; C. E. Shelby, Clarksburg; G. O. Young, Buckhannon.

DISTRICT NO. 3.—*Chairman*, W. B. Day, 715 S Wood St., Chicago, Ill. Including Ohio, Indiana Illinois, Kentucky, Michigan, Missouri, Kansas.

Illinois.—*Chairman*, Robert W. Sterling, Dixon; Byron Armstrong, Jacksonville; Fred W. Metzger, Springfield; G. M. Bennett, Urbana; Herman S. Waller, Chicago; R. E. Terry, Chicago.

Indiana.—*Chairman*, John A. J. Funk, Galveston; F. W. Meissner, Jr., La Porte; Swan Brookshire, Indianapolis; C. B. Jordan, Lafayette; R. B. Rothrock, Evansville; F. V. McCullough, New Albany.

Kansas.—*Chairman*, Roy C. Reese, Topeka; W. M. Childs, Eldorado; F. A. Milne, Pratt; Jonathan Schmitter, Gypsum; D. H. Spencer, Lawrence; A. H. King, Manhattan.

Kentucky.—*Chairman*, George D. Duncan, Franklin; Linwood A. Brown, Lexington; J. W. Gayle, Frankfort; G. L. Curry, Louisville.

Michigan.—*Chairman*, J. J. Burniac, Detroit; A. F. Wheeler, Detroit; E. E. Durham, Corunna; M. S. Moore, Lansing; R. T. Lakey, Detroit; O. H. Haarer, Ann Arbor.

Missouri.—*Chairman*, A. W. Pauley, St. Louis; D. V. Whitney, Kansas City; W. H. Lamont, St. Louis; Z. V. Kerrigan, St. Louis; Henry J. Nie, Kansas City.

Ohio.—*Chairman*, F. H. Freericks, Cincinnati; Theodore D. Wetterstroem, Columbus; W. M. Bowman, Toledo; M. N. Ford, Columbus; F. J. Cermak, Cleveland; J. S. Rutledge, Akron.

DISTRICT NO. 4.—*Chairman*, R. C. Wilson, Athens, Ga. Including North Carolina, South Carolina, Tennessee, Georgia, Alabama, Mississippi, Florida, Arkansas, Louisiana, Oklahoma, Texas, Panama, Cuba, Porto Rico, Mexico.

Alabama.—*Chairman*, Sam A. Williams, Troy; W. E. Bingham, Tuscaloosa; H. E. Duncan, Birmingham; Carl Whorton, Gadsden; L. C. Lewis, Tuskegee.

Arkansas.—*Chairman*, E. D. Oslin, Little Rock; M. A. Eisele, Hot Springs; L. K. Snodgrass, Little Rock; W. I. Brite, Fort Smith; J. K. Poch, No. Little Rock.

Cuba.—*Chairman*, José P. Alacan, Havana; José Guillermo Diaz, Havana; Baudilio Castellanos, Mercane.

Florida.—*Chairman*, N. H. Hunter, Fort Myers; W. J. Husa, Gainesville; J. K. Clemmer, Miami; G. H. Grommet, Miami; H. W. Childs, St. Petersburg.

Georgia.—*Chairman*, J. B. Pendergrast, Atlanta; R. H. Land, Jr., Augusta; Claude Rountree, Thomasville; Orion Page, Oak Park; T. C. Marshall, Atlanta.

Louisiana.—*Chairman*, C. R. Caldwell, Shreveport; Adam Wirth, New Orleans; John W. Collens, Monroe; Clovis J. Bouvier, Destrehan; Marion Legendre, New Orleans.

Mexico.—*Chairman*, G. G. Colin, Mexico City.

Mississippi.—*Chairman*, C. E. Wilson, Corinth; J. T. Mathis, Leland; W. B. Tabb, Houston; J. A. Beard, McComb; E. L. Hammond, University, Miss.

North Carolina.—*Chairman*, J. Thomas Underwood, Liberty; W. W. Horne, Fayetteville; E. V. Zoeller, Tarboro; J. A. Goode, Asheville; C. P. Greyer, Morgantown.

Oklahoma.—*Chairman*, Cecil D. Jay, Pawnee; F. H. Hudelson, Weatherford; D. F. McLemore, Britton; D. B. R. Johnson, Norman; Tom Roach, Oklahoma City.

Panama.—*Chairman*, Bolivar Jurado, Panama City.

Porto Rico.—*Chairman*, Dr. Jacobo Simonet, Rio Piedras; Miguel A. Veve, Fajardo; Luis Mulet, Mayaguez; J. P. Serra, San Juan.

South Carolina.—*Chairman*, D. T. Riley, Florence; I. A. Rigby, Spartanburg; W. H. Zeigler, Charleston; J. D. Yongue, Pickens; F. M. Smith, Charleston.

Tennessee.—*Chairman*, J. W. Jones, Bristol; W. P. Winter, So. Nashville; R. R. Ferrell, Memphis; Gay Clark, Morristown.

Texas.—*Chairman*, Henry F. Hein, San Antonio; W. J. Danforth, Fort Worth; E. B. Oliver, Longview; W. H. Cousins, Dallas; W. F. Gidley, Austin; W. D. Adams, Forney.

DISTRICT NO. 5.—*Chairman*, D. F. Jones, Watertown, S. Dak. Including Montana, Wisconsin, Iowa, Nebraska, Minnesota, North Dakota, South Dakota.

Iowa.—*Chairman*, Denny Brann, Des Moines; Lee S. Coy, Cedar Rapids; R. A. Kuever, Iowa City; John W. Slocum, Indianola; E. O. Kagy, Des Moines.

Minnesota.—*Chairman*, H. H. Gregg, Jr., Minneapolis; Gustav Bachman, Minneapolis; W. A. Abbett, Duluth; J. B. Christgau, Owatonna; Joseph Vadheim, Tyler.

Montana.—*Chairman*, W. A. Woehner, Great Falls; W. R. Montgomery, Butte; C. E. F. Mollett, Missoula; F. A. Scheuber, Livingston; L. W. Richards, Missoula.

Nebraska.—*Chairman*, Melvin E. Rasdal, Ogallala; R. A. Lyman, Lincoln; Howard C. Newton, Omaha; F. J. Creutz, Wausa; Niels Mikkelsen, Kenesaw.

(Continued on page xiv)

Mention the Journal of the A. Ph. A. when writing advertisers—It identifies you.

THE GEORGE WASHINGTON UNIVERSITY, SCHOOL OF PHARMACY

(National College of Pharmacy, 1872-1906)

21st Street at G, N. W. **Washington, D. C.**

Students have the advantages offered by the Government Libraries, Laboratories and Museums. The School of Pharmacy is located within a few blocks of the site of the Pharmacy Headquarters Building.

Academic courses are taken in the School of Letters and Sciences with full collegiate credit.

This School holds membership in The American Association of Colleges of Pharmacy and offers the degree of Bachelor of Science in Pharmacy for the four-year course.

For catalog, entrance requirements and other information apply to the Registrar.

COLLEGE OF PHARMACY AND CHEMISTRY, DETROIT INSTITUTE OF TECHNOLOGY

Graduation from an accredited high school is required of all applicants for admission as candidates for a degree. Four-year course in Pharmacy, leading to the degree of Bachelor of Science in Pharmacy. Four-year course in Chemistry, leading to the degree of Bachelor of Science in Chemistry. Each year through the co-operation of the College, the Alumni and Detroit Pharmacists, many students are placed in part-time positions. Spring Semester starts Feb. 5, 1934. **Write for Catalog.**

E. P. STOUT, Dean. 303 Downtown Y. M. C. A. Bldg. Detroit, Mich. 2020 Witherell St.

ST. LOUIS COLLEGE OF PHARMACY

Graduation from an accredited high school or certificate showing equivalent of High School graduation necessary for admittance to the Degree Courses.
Four years leading to the degree of Bachelor of Science (B.S.).
Special students admitted to any course.

Next session begins September 25, 1933.
For information write: Charles E. Caspari, Dean, 4588 Parkview, St. Louis, Mo.

North Dakota.—*Chairman*, M. N. Brakke, McVille; P. H. Costello, Cooperstown; Burt Finney, Bismarck; W. H. Schram, Hillsboro; W. F. Sudro, Fargo.

South Dakota.—*Chairman*, Fred Vilas, Pierre; E. R. Serles, Brookings; H. J. Schnaidt, Parkton; P. K. Bernhart, Sioux City; Rowland Jones, Gettysburg.

Wisconsin.—*Chairman*, G. V. Kradwell, Racine; George L. Sontag, Nashville; E. J. Raeuber, Milwaukee; Ralph W. Clark, Madison; E. J. Ireland, Madison.

DISTRICT NO. 6.—*Chairman*, John Culley, 503 Sheldon Bldg., San Francisco, Calif. Including California, Nevada, Utah, Colorado, New Mexico, Arizona, Philippine Islands.

Arizona.—*Chairman*, A. L. Phelps, Phoenix; Seth P. Grandy, Mesa; J. B. Weber, Chandler; Fred W. Ritter, Phoenix.

California.—*Chairman*, R. S. Warnack, Los Angeles; R. H. Bohmansson, Eureka; F. E. Mortenson, Hollywood; G. H. P. Lichthardt, Sacramento; Louis Doerr, San Jose.

Colorado.—*Chairman*, J. P. Murray, Colorado Springs; C. J. Clayton, Denver; C. F. Poe, Boulder; J. E. Stauffer, Rifle; A. D. Baker, Denver.

Nevada.—*Chairman*, W. R. Englert, Elk; R. W. Fleming, Tonopah.

New Mexico.—*Chairman*, B. C. Ruppe, Albuquerque; W. W. McAdoo, Carlsbad; D. L. C. Hover, Cloudcroft.

Philippine Islands.—*Chairman*, Eduardo A. Castilo, Manila; Petrocinio Valenzuela, Manila.

Utah.—*Chairman*, H. E. Petersen, Cedar City; W. L. Eddy, Brigham City; Fred Anstee, Salt Lake City; George F. Flashmann, Salt Lake City.

DISTRICT NO. 7.—*Chairman*, F. C. Felter, 35 N. 9th St., Portland, Oregon. Including Washington, Oregon, Idaho, Wyoming, Alaska.

Alaska.—*Chairman*, Z. J. Loussac, Anchorage; Elwyn Swetman, Seward; William Britt, Juneau.

Idaho.—*Chairman*, E. O. Leonard, Pocatello; L. L. Robertson, Nezperce; Charles Carter, Moscow.

Oregon.—*Chairman*, Frank Nau, Portland; C. I. Clough, Tillamook; I. L. Betzel, Bend; Adolph Ziefle, Corvallis; A. O. Mickelson, Portland.

Washington.—*Chairman*, R. A. Cain, Seattle; P. H. Dirstine, Pullman; Roy McConkey, Shelton; H. W. Ayres, Seattle.

Wyoming.—*Chairman*, A. E. Roedel, Cheyenne; W. H. Edelman, Sheridan; John Tripeny, Casper.

DISTRICT NO. 8.—*Chairman*, Charles F. Heebner, Ontario College of Pharmacy, Toronto, Ontario; H. E. J. Bletcher, Winnipeg; E. L. Woods, Saskatoon; Alex B. J. Moore, Montreal; G. A. Burbidge, Halifax. R. B. J. Stanbury, Toronto.

Philadelphia College of PHARMACY and SCIENCE

FOUNDED 1821

114th Session Begins Sept. 18, 1934

DEGREES GRANTED

Bachelor of Science — Master of Science
Doctor of Science

BACTERIOLOGY BIOLOGY
CHEMISTRY PHARMACY

WRITE OR CALL FOR CATALOG

The Massachusetts College of Pharmacy

Longwood Avenue **Boston, Massachusetts**

A College of Pharmacy, controlled and managed by pharmacists, in which the teaching is largely by the laboratory method. The possession of a liberal endowment makes it possible to give superior courses at moderate cost to the student.

Graduation from a recognized high school or an equivalent education, shown by certificate or examination, is required for entrance.

Four-year course required for graduation.

Many students work for a part of the time while taking the course. The College is frequently able to assist such students to find positions.

The annual session begins during the latter part of September and ends during June.

The Demand for Graduates of this School is in Excess of the Supply.

For catalogue and further information, write to

THEODORE J. BRADLEY, Dean

School of Pharmacy, University of Maryland

(Maryland College of Pharmacy, 1841–1904)

Session begins September 28, 1933. Four-year course leading to the degree of Bachelor of Science in Pharmacy. Entrance requirements, graduation from a four-year high school or its equivalent. Graduate work in pharmacy, pharmacology, chemistry, etc.

Baltimore, Maryland **A. G. DuMez, *Dean***

University of Illinois College of Pharmacy

Chicago College of Pharmacy, 1859–1896)

Offers a four-year course leading to the degree of Bachelor of Science in Pharmacy. The next session begins October 1, 1934. The first year is administered as a pre-pharmacy year which may be taken in the College of Liberal Arts and Sciences of the University of Illinois or in any other accredited college offering the subjects specified.

For bulletin with detailed information address W. B. Day, Dean, 715 S. Wood St., Chicago

CONFERENCES.

Drug Trade Bureau of Public Information.—Members, the AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association of Retail Druggists, the National Wholesale Druggists' Association, the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy.

President, Ambrose Hunsberger, Philadelphia, Pa.; *Secretary-Treasurer*, H. C. Christensen, 130 N. Wells St., Chicago, Ill.

National Conference on Pharmaceutical Research.—*Chairman*, E. N. Gathercoal, Chicago; *Vice-Chairman*, William J. Husa, Gainesville, Fla.; *Secretary*, John C. Krantz, Jr., Baltimore; *Treasurer*, Fitzgerald Dunning, Baltimore; *Executive Committee*, H. V. Arny, Montclair, N. J.; R. L. Swain, Baltimore; F. C. Bibbins, Indianapolis. *Place of Meeting*, Washington, D. C.

Conference Pharmaceutical Association Secretaries.—*President*, Robert C. Wilson, University of Georgia, Athens, Ga.; *First Vice-President*, F. B. McCullough, New Albany, Ind.; *Second Vice-President*, E. R. Weaver, Stillwater, Okla.; *Secretary-Treasurer*, Carl G. A. Harring, 20 Glen Road, Newton Center, Mass.; *Delegate to the House of Delegates*, Wm. B. Day, Chicago, Ill.; *Members of the Executive Committee*, J. Lester Hayman, Morgantown, W. Va.; J. J. Gill, Providence, R. I.; Roy Reese, Topeka, Kans.; W. E. Bingham, Tuscaloosa, Ala.

Conference of Pharmaceutical Law Enforcement Officials.—*Chairman*, R. L. Swain, 2411 No. Charles St. Baltimore, Md.; *Secretary-Treasurer*, N. N. Ford, New State Office Building, Room G-18, Columbus, Ohio; *Delegate to the House of Delegates*, Fred Schaefer, Brooklyn, N. Y.

National Drug Trade Conference.—*President*, Carson P. Frailey, Washington, D. C.; *Vice-President*, Ambrose Hunsberger, Philadelphia, Pa.; *Secretary-Treasurer*, E. F. Kelly, Baltimore. *Councilor to the Chamber of Commerce, U. S. A.*, S. L. Hilton, Washington, D. C. *Place of Meeting*, Washington. *Time*, December 5, 1933.

Plant Science Seminar.—*Chairman*, Frank H. Eby, 240 Powell Road, Springfield, Pa.; *Vice-Chairman*, L. K. Darbaker, 424 Franklin Ave., Wilkensburg, Pa.; *Secretary-Treasurer*, F. J. Bacon, Western Reserve University, Cleveland, Ohio; *Executive Committee*, C. E. F. Mollett, Montana; E. B. Fisher, Minnesota. *Place of Meeting*, Washington, D. C.

International Pharmaceutical Federation.—*President*, L. van Itallie, The University, Leyden, Holland; *General Secretary*, T. Potjewijd, 43 Leeuwerikatraat, Leyden, Holland.

Hospital Pharmacists' Association of Southern California.—*President*, Michael Brodskey, Cedars Lebanon Hospital, 4833 Fountain Ave., Hollywood, Cal.; *Vice-President*, Miss Mabel Pool, Pasadena Hospital, Pasadena, Cal.; *Secretary-Treasurer*, Miss Alice Hooper, Hollywood Hospital, 1322 No. Vermont Ave., Hollywood, Cal.

Inter-Society Color Council.—*Chairman*, E. N. Gathercoal, Chicago; *Vice-Chairman*, L. A. Jones, Rochester; *Treasurer*, A. E. O. Munsell, Baltimore; *Secretary*, M. Rea Paul, Brooklyn.

PICTURES SUITABLE FOR FRAMING

Photo of Entrance to Pharmacy Headquarters Building, Washington, mat 12 x 14. Post-paid $1.00. Dr. William Withering, photograph, $1.00 post-paid.

Prof. Frederick B. Power in Laboratory, $1.00, by mail post-paid.

Photograph 8 x 10, as shown on page 644 of July 1932 issue, unmounted 75 cents, mounted $1.00.

Photograph of Model Headquarters, A. PH. A., May issue, page 374, mounted, 6 x 12, $1.00. **Address Journal A. Ph. A., 10 West Chase Street, Baltimore, Md.**

Mention the Journal of the A. Ph. A. when writing advertisers—It identifies you.

A. PH. A. LOCAL BRANCHES

Secretaries will please report incorrections and elections. Also render reports of meetings. Thank you.

BALTIMORE.

No fixed meeting night.

President, Simon Solomon.
Vice-President, W. F. Reindollar.
Secretary-Treasurer, C. Jelleff Carr.

Chairmen of Committees: Membership, B. O. Cole; Professional Relations, E. G. Eberle; Science and Practice of Pharmacy, Marvin J. Andrews; Education and Legislation, R. L. Swain.

CHICAGO.

Meet third Tuesday.

President, R. E. Terry.
First Vice-President, G. L. Webster.
Second Vice-President, R. A. G. Linke.
Third Vice-President, S. W. Morrison.
Delegate to the House of Delegates, E. N. Gathercoal.
Secretary-Treasurer, Lawrence Templeton.

Committee Chairmen: Membership, Thomas F. Rylanda; Legislation, J. Riemenschneider; Practice, I. A. Becker; Medical Relations, Dr. Bernard Fantus; Publicity, Samuel C. Henry.

CINCINNATI.

Meet second Tuesday.

President, C. W. Sondern.
Vice-President, T. H. Rider.
Secretary, R. L. Puls.
Treasurer, John P. Jennie.
Delegate to the House of Delegates, A. Ph. A., Frank H. Freericks.

Trustees: C. G. Merrell (1937), B. J. Kotte (1936), Nicholas Blank (1935), Frank H. Freericks (1934), Bertha M. Ott (1933).

DETROIT.

Meet third Thursday.

President, Felix Johnson.
First Vice-President, Lawrence Maliche.
Second Vice-President, Frederick Arnold.

Student Council, Hamilton Whitman and Florence Hartsoff, U. of M.; Henry Tyszka and William Hennesy, D. I. T.; Perton Todd and William Blatchley, C. C. D.; *Council of Clerks*, Robert Woonsocket, U. of M.; Douglas Robinson, D. I. T.; James Lidell, C. C. D.; *Secretary*, Bernard A. Bialk; *Treasurer*, Fred Ingram; *Chairman Program Committee*, R. T. Lakey.

NEW YORK.

Meet second Monday.

President, Ernst A. Bilhuber.
Vice-President, Charles W. Ballard.
Secretary, Rudolf O. Hauck.
Treasurer, Turner F. Currens.
Delegate to House of Delegates, Hugo H. Schaefer.

Chairmen of Committees: Professional Relations, James H. Kidder; *Audit*, Joseph L. Mayer; *Membership*, Herbert C. Kassner; *Progress of Pharmacy*, Charles E. Heimerzheim; *Education and Legislation*, Robert S. Lehman.

NORTHERN NEW JERSEY.

Honorary President, Philemon E. Hommell.
President, Ernest Little.
Vice-President, George C. Schicks.
Secretary, L. W. Rising.
Treasurer, A. F. Marquier.

NORTHERN OHIO.

President, Andrew Walleck.
Vice-President, A. P. Gegenheimer.
Secretary, F. J. Bacon.
Treasurer, Herbert Decker.

Members of Council: (1933) Herbert Decker, Eugene Remy, Nelson Scribner, Andrew E. Walleck; (1934) F. J. Bacon, N. T. Chamberlin, A. P. Gegenheimer, Alex Steiner; (1935) H. E. Benfield, E. D. Davy, F. W. Gehrung, Harry Speer; (1936) A. B. Ejbl, A. L. Flandermeyer, Ellsworth Loesch, Edward Spease.

NORTH PACIFIC.

President, A. O. Mickelsen.
First Vice-President, L. G. Haack.
Second Vice-President, John T. Witty.
Secretary-Treasurer, Harvey J. Donnell.

Chairmen of Committees: Practical Pharmacy, Harry Weis; Professional Relations, L. G. Haack; Programs, Earl Gunther; Membership, Frank Nau.

NORTHWESTERN.

President, R. Almin.
Secretary-Treasurer, C. V. Netz.

PHILADELPHIA.

Meet second Tuesday.

President, Frank H. Eby.
First Vice-President, George A. Slothower.
Second Vice-President, Theodore Campbell, Jr.
Secretary-Treasurer, Edmund H. MacLaughlin.

Chairmen of Committees: Practical Pharmacy, John Walton; Professional Relations, Wm. L. Cliffe; Membership, Harvey P. Frank; Entertainment, J. W. E. Harrisson.

Delegate to the House of Delegates, Ambrose Hunsberger.

PITTSBURGH.

Meet third Tuesday.

President, Clarence T. Van Meter.
Vice-President, Bernard F. Daubert.
Secretary-Treasurer, Frank S. McGinnis.
Delegate to the House of Delegates, C. Leonard O'Connell.

UNIVERSITY OF WASHINGTON.

Meet last Thursday of month.

President, Earl Guth.
Vice-President, Einer E. Johnson.
Secretary-Treasurer, H. A. Langenhan.

WESTERN NEW YORK.

Meet first Thursday of month.

President, Lewis G. Freeman.
First Vice-President, James A. Donovan.
Second Vice-President, B. A. Heath.
Secretary, Laurence D. Lockie.
Treasurer, W. L. Seibert.

CALIFORNIA COLLEGE OF PHARMACY, STUDENT BRANCH.

President, John Isi.
Vice-President, Allen Caldeira.
Secretary, Eugene Bettencourt.
Treasurer, William Uomini.

UNIVERSITY OF FLORIDA, STUDENT BRANCH.

President, George R. Jones.
Vice-President, Milton H. Fulmer.
Secretary, G. C. Sparks, Jr.
Treasurer, R. S. Johnson.

UNIVERSITY OF NORTH CAROLINA, STUDENT BRANCH.

President, L. G. Barefoot.
First Vice-President, D. B. Forrest.
Second Vice-President, C. B. Clark, Jr.
Secretary-Treasurer, H. M. Dellinger.

STUDENT BRANCH, PITTSBURGH COLLEGE OF PHARMACY.

President, Paul H. Geer.
Vice-President, John Gabig.
Secretary, Greyson Lewis.
Treasurer, Arthur Schindel.

SOUTH DAKOTA STATE COLLEGE, STUDENT BRANCH.

President, Frederick J. Ahlfs.
Vice-President, Stanford Maresh.
Secretary, Eugene C. Kuske.
Treasurer, Charles F. Buck.

STUDENT BRANCH, STATE COLLEGE OF WASHINGTON.

President, Harleigh Lines.
First Vice-President, Marlowe Dittebrandt.
Second Vice-President, Wallace Lindahl.
Secretary-Treasurer, Belle Wenz.

WESTERN RESERVE, STUDENT BRANCH.

President, Winton A. Webb.
Vice-President, Karl W. Schweickardt.
Secretary-Treasurer, John A. Obester.

UNIVERSITY OF WISCONSIN, STUDENT BRANCH.

President, George Vosmek, Antigo.
Vice-President, George I. Schefelker, Stoughton.
Secretary, Norman Glander, Manitowoc.
Treasurer, Arnie Stensby, Stoughton.
Advisor, Edward J. Ireland.

STATE BOARDS OF PHARMACY MEMBERS AND SECRETARIES.

(List revised in accordance with information received to September 1, 1933.)

Alabama.—*President*, S. A. Williams, Troy; *Vice-President*, L. C. Lewis, Tuskegee; *Treasurer*, Hal E. Duncan, Birmingham; *Secretary*, W. E. Bingham, Box 64, Tuscaloosa; Paul Molyneux, Mobile.

Alaska.—*President*, N. R. Walker, Ketchikan; *Vice-President*, R. T. Kubon, Fairbanks; *Secretary-Treasurer*, Elwyn Swetmann. First Division, Harry N. Race, Juneau; N. R. Walker, Ketchikan. Second Division, . Third Division, Z. J. Loussac, Anchorage. Fourth Division, F. M. Dunham, Fairbanks; R. T. Kubon, Fairbanks.

Arizona.—*President*, Jack M. Robertson, Phoenix; *Vice-President*, Sam Ensminger, Prescott; *Secretary-Treasurer*, L. Evans, Jr., Phoenix; *Examiners*, Fred W. Ritter, Phoenix; H. A. Twinning, Phoenix; Andrew P. Martin, Tucson.

Arkansas.—*President*, Booker Latimer, DeWitt; *Vice-President*, H. H. Horst, Stuttgart; *Secretary*, H. W. Parker, Jonesboro; C. R. Counts, Mulberry; J. K. Poch, N. Little Rock.

California.—*President*, W. M. Fulton, Long Beach; *Secretary*, Louis Zeh, 316 State Office Building, San Francisco; Victor L. Schaefer, Alameda; Charles Swiggett, Los Angeles; Andre Rouseyrol, Los Angeles; John S. O'Callaghan, San Francisco; L. A. Mattes, Berkeley.

Colorado.—*President*, Joseph P. Murray, Colorado Springs; *Secretary*, Arthur D. Baker, 228 State Capitol Bldg., Denver; Thomas C. Coltman, Breckenridge.

Connecticut.—*President*, George Blackall, Bristol; *Vice-President*, C. T. Gilbert, Noroton; *Secretary-Treasurer*, Hugh P. Beirne, 615 Howard Ave., New Haven; Charles Gustafson, Hartford; Edward J. Murphy, Manchester.

Delaware.—*President*, Thomas H. Cappeau, Wilmington; *Vice-President*, Reuben M. Kaufman, Seaford; *Secretary-Treasurer*, John O. Bosley, Wilmington; George W. Rhodes, Newark; James W. Wise, Dover.

District of Columbia.—*President*, A. C. Taylor, 150 C St., N. E., Washington, D. C.; *Secretary*, W. T. Kerfoot, Jr., 7th & L Sts., N. W., Washington, D. C.; *Treasurer*, P. T. Hafelfinger, 4219 Eighth Street, N. W., Washington, D. C.; R. L. Quigley, 2036 G St., N. W., Washington, D. C.; Louis F. Bradley, 701 Maryland Ave., N. E., Washington, D. C.

Florida.—*President*, N. H. Hunter, Ft. Myers; *Vice-President*, John K. Clemmer, Miami; *Secretary-Treasurer*, J. H. Haughton, Palatka; W. M. Hankins, Daytona; Hamilton Russell, Pensacola.

Georgia.—*President*, C. H. Evans, Warrenton; *Joint Secretary*, Georgia Examining Boards, R. C. Coleman, Atlanta; W. G. Bridges, Columbus; H. A. Deen, Vidalia; J. L. Hawk, Atlanta; H. A. Herrin, Winder.

Idaho.—The board of pharmacy operates in conjunction with the Department of Law Enforcement. Communications should be directed to the Department, Fred E. Lukens, Commissioner of Law Enforcement; Charles Laurenson, Director of Licenses, Boise, Idaho.

Illinois.—*Director*, Department of Registration and Education, M. F. Walsh, Springfield; *Superintendent of Registration*, Paul B. Johnson, Springfield; *Members of Examining Board: President*, W. S. Denton, Springfield; *Secretary*, Robert W. Sterling, Dixon; Mrs. Alice E. Pelikan, 918 Columbian Ave., Oak Park; J. A. Topf, 2000 Larrabee St., Chicago; Fred Hill, Kewanee.

Indiana.—*President*, John A. J. Funk, Galveston; *Secretary*, Oscar E. Russell, Elkhart; Russell B. Rothrock, Evansville; Albert Fritz, Indianapolis; Edgar O'Harrow, Bloomington.

Iowa.—*Chairman*, George Judisch, Ames; *Secretary*, Walter F. Meads, State House, Des Moines; John H. Weber, Cascade; George W. Gillman, Fort Dodge.

Kansas.—*President*, Roy M. Riley, Wichita; *Secretary*, Mac Childs, Eldorado; *Treasurer*, Percy Walker, Topeka; Frank A. Milne, Pratt; A. H. King, Manhattan.

Kentucky.—*President*, George Wilhelmi, Newport; *Secretary*, J. W. Gayle, 228 W. Main St., Frankfort; *Treasurer*, Albert E. Ely, Glasgow; Gelon R. McGinnis, Louisville; Linwood A. Brown, Lexington; Frank M. Patterson, Hawesville.

Louisiana.—*President*, Wm. August Worner, New Orleans; *Secretary*, John E. Guess, Hammond; J. P Campbell, Jr., Alexandria; Charles M. Daspit, Houma, W. E. Harter, R. F. D. 2, Box 46, New Orleans; T. A. Chisholm, Eunice; Fred R. Crosby, Ruston; E. H. White, Oil City; Edward H. Walsdorf, New Orleans.

Maine.—*President*, Alfred P. Manson, Gardiner; *Secretary*, Charles S. Pierce, Springvale; Leon Marr, Farmington.

Maryland.—*President*, Lloyd N. Richardson, Bel Air; *Secretary-Treasurer*, Robert L. Swain, 2411 N. Charles St., Baltimore; George A. Bunting, 32nd and Falls Cliff Rd., Baltimore; William C. Powell, Snow Hill; H. R. Rudy, Hagerstown.

Massachusetts.—*President*, William Hardie, Fall River; *Secretary*, Wm. R. Acheson, 146 State House, Boston; John R. Sawyer, Jamaica Plain; John F. Walsh, Lowell; Charles W. King, Boston.

Michigan.—*President*, Clare F. Allan, Wyandotte; *Vice-President*, J. Howard Hurd, Flint; *Secretary and Director*, E. J. Parr, State Office Building, Lansing; Duncan Weaver, Fennville; Earl Durham, Coruna; M. N. Henry, Lowell.

Minnesota.—*President*, Hugo O. Peterson, Minneapolis; *Secretary*, John W. Dargavel, 2943—27th Ave. South, Minneapolis; William C. Muesing, New Ulm; George T. Kermott, Duluth; J. P. Jelinek, St. Paul; John E. Nelson, Lake Park.

Mississippi.—*President*, Kelly Patterson, Jackson; *Secretary*, Lew Wallace, Laurel; W. H. Rose, West Point; Walter N. Temple, Bude; N. S. Fox, Louisville.

Missouri.—*President*, W. H. Ellis, Vandalia; *Vice-President*, H. C. Jamison, Joplin; *Secretary*, H. W. Reuter, 5801 Gravois Ave., St. Louis; W. C. Bender, St. Joseph; C. N. Gardner, Kansas City.

Montana.—*President*, John W. Seiden, Lewistown; *Vice-President*, Charles J. Chapple, Billings; *Secretary*, J. A. Riedel, Boulder; *Treasurer*, Alex. F. Peterson, Missoula; F. V. Patterson, Billings; S. V. Justus, Whitehall; R. J. Schafferzick, White Sulphur Springs.

Nebraska.—*Director*, Bureau of Examining Boards, Mrs. Clark Perkins, State House, Lincoln; *Members of Examining Board: President*, G. G. Samuelson, Milford; *Vice-President*, C. A. Sprague, Omaha; *Secretary*, Don A. Brooke, Hastings.

Nevada.—*President*, E. B. Loring, Fallon; *Secretary*, R. W. Fleming, Box 813, Reno; Frank Schwartz, Ely; Howard M. Skeels, Reno; W. E. Ferron, Las Vegas.

New Hampshire.—*President*, John R. Kelly, Newport; *Secretary*, Frank R. French, Tilton; Percy J. Callaghan, Manchester.

New Jersey.—*President*, W. Scott Taylor, Trenton; *Vice-President*, James J. A. Bauman, Ridgewood; *Treasurer*, Albert J. Smith, Bradley Beach; *Secretary*, Robert P. Fischelis, 28 West State St., Trenton; C. Graham McCloskey, Elizabeth; Dean B. Crawford, Atlantic City.

New Mexico.—*President*, S. J. Mollands, Taos; *Vice-President*, Champ Carter, Silver City; *Secretary-Treasurer*, George Sasser, Clovis; C. C. Hausaman, Albuquerque; Frank M. Delgado, Las Vegas.

New York.—*President*, Frank S. Houck, Gloversville; *Vice-President*, Fred C. A. Schaefer, Brooklyn; *Secretary*, George W. Mather, Education Bldg., Albany; George C. Diekman, Brooklyn; J. Leon Lascoff, New York City; William Mansfield, Albany; Elmer E. Chilson, Rochester; Charles H. Gauger, Buffalo; Willard H. Roberts, Utica; Wm. C. Anderson, Brooklyn.

North Carolina.—*President*, E. V. Zoeller, Tarboro; *Secretary-Treasurer*, F. W. Hancock, Oxford; W. Lee Moose, Albermarle; James G. Ballew, Lenoir; W. W. Horne, Fayetteville.

North Dakota.—*President*, E. P. Martin, Hazen; *Secretary*, P. H. Costello, Cooperstown; W. H. Schram, Hillsboro; N. N. Brakke, McVille; Burt Finney, Bismarck.

Ohio.—*President*, J. S. Rutledge, Akron; *Vice-President*, Charles Ehlers, Cincinnati; *Secretary*, M. N. Ford, Room G-18, New State Office Bldg., Columbus; Ralph C. Knisely, Ravenna; Henry A. Stype, Wooster; F. H. King, Delphos.

(Continued on page xviii)

Mention the Journal of the A. Ph. A. when writing advertisers—It identifies you.

Oklahoma.—*President*, W. D. Patterson, El Reno; *Vice-President*, Carey F. Miles, Buffalo; *Secretary*, C. M. Brewer, State Capitol, Oklahoma City; *Treasurer*, Thomas B. Casey, Tishomingo; Charles L. Rogers, Tahlequah.

Oregon.—*President*, M. E. McKee, Moro; E. B. Magee, Klamath Falls; *Secretary*, Linn E. Jones, 622 Oregon Bldg., Portland; *Treasurer*, M. C. Kaegi, Portland; John F. Allen, Corvallis; Frank O. Berg, Astoria.

Pennsylvania.—*President*, Lucius L. Walton, Williamsport; *Secretary*, Miss Grace Wilbar, Education Bldg., Harrisburg; John M. Woodside, Philadelphia; Percy M. Davis, Scranton; Charles C. Campbell, Pittsburgh; Harry H. Buch, Harrisburg.

Philippine.—*President*, Pedro T. Maglalang; *Members*, Dr. José E. Jimenez; Florencio Gavino; Dr. José V. Gloria, *Permanent Secretary* of the Board of Medical, Pharmaceutical, Dental, Nurses and Optical Examiners; Felipe Concepcion, *Chief, Drug and Pharmacy Division*; Attorney Ambrosio Umali, *Chief Clerk and Disbursing Officer*, Board of Examiners.

Porto Rico.—*President*, Carlos A. del Rosario, San Juan; *Secretary*, Carlos Garcia de Quevedo, Offices of the Government Examining Boards, Department of Health Building, San Juan; *Treasurer*, Ramon L. Daubon, San Juan; Ramon Lopez Irizarry, San Juan; Washington Llorens, Arecibo.

Rhode Island.—*President*, Charles F. Gilson, Centerdale; *Secretary-Registrar*, Michael H. Corrigan, Providence; Howard A. Pearce, Providence; Herve J. Brunelle, Woonsocket; Clarence A. Vars, Westerly; Thomas E. Hunt, Newport; Albert Zurlinden, Manville.

South Carolina.—*Chairman*, ; *Secretary*, J. M. Atkinson, 2911 Devine St., Columbia; John H. Frierson, Charleston; L. E. Bishop, Laurens; John H. Walker, Greer; C. E. Powe, Hartsville; E. P. Walsh, Conway; Carl F. Gibson, Columbia.

South Dakota.—*President*, Fred L. Vilas, Pierre; *Secretary*, Rowland Jones, Gettysburg; *Treasurer*, Frank S. Bockoven, Clark H. A. Sasse, Redfield; H. J. Schnaidt, Parkston.

Tennessee.—*President*, Samuel S. Bradshaw, Nashville; *Vice-President*, George W. Lamar, Memphis; *Secretary*, J. B. Sands, Nashville; George W. Lamar, Memphis; Sam Bradshaw, Nashville; J. Henry White, Jackson; Frank Bogart, Chattanooga; W. J. Ellis, Knoxville; *Inspector*, J. B. Crosthwaite, Nashville; *Attorney*, Rufus Hickey, Nashville.

Texas.—*President*, C. B. Allison, Dallas; *Vice-President*, Emmett E. Weaver, Ft. Worth; *Secretary*, W. H. Cousins, Dallas; Erwin M. Joseph, Austin; Paul D. Carroll, Texarkana; J. Dan Allen, Houston; John A. Weeks, Ballinger.

Utah.—*Director*, Department of Registration, S. W. Golding, Salt Lake City; *Secretary*, W. H. Dayton, Salt Lake City; Archibald Bevan, Tooele; Frank J. Folland, Salt Lake City.

Vermont.—*President*, Owen W. McShane, Poultney; *Secretary*, Fred D. Pierce, Barton; *Treasurer*, W. B. Shangraw, Rutland; William H. Saunders, Lyndonville; Harris W. Alexander, St. Albans.

Virginia.—*President*, H. C. Littlejohn, Leesburg; *Vice-President*, D. E. Seagle, Pulaski; Edward P. Turner, Newport News; *Secretary-Treasurer*, A. L. I. Winne, 105 State Office Building, Richmond; S. C. Brooks, Winchester; J. C. Kearfoot, Martinsville.

Washington.—*Department of Licenses, Director*, Charles R. Maybury, Olympia; *Assistant Director*, George L. Berger, Olympia. *Members Pharmacy Examining Board:* Roland Robertson, Spokane; Guy Norton, Tacoma; Charles Young, Centralia.

West Virginia.—*President*, S. M. Scott, Jr., Terra Alta; *Secretary*, Roy B. Cook, Box 710, Charleston; Frank B. Haymaker, Clarksburg; Mrs. M. H. Judy, Petersburg; C. W. Collins, Parkersburg.

Wisconsin.—*President*, G. V. Kradwell, Racine; *Secretary*, H. G. Ruenzel, 2332 Vliet St., Milwaukee; Edwin Boberg, Eau Claire; Oscar Rennebohm, Madison; B. J. Kremer, Fond du Lac.

Wyoming.—*President*, A. E. Roedel, Cheyenne; *Vice-President*, R. C. Schultz, Worland; *Secretary*, C. C. Earl, Lander.

Officers National Association Boards of Pharmacy.—*President*, C. T. Gilbert, Noroton, Conn.; *Honorary President*, Henry G. Ruenzel, Milwaukee, Wis.; *Vice-Presidents*, C. S. Pierce, Maine; Robert P. Fischelis, New Jersey; R. B. Rothrock, Indiana; Rowland Jones, South Dakota; Roy Cook, West Virginia; E. M. Joseph, Texas; C. H. Evans, Georgia; R. C. Schultz, Wyoming; Howard M. Skeels, Nevada; *Secretary*, H. C. Christensen, 130 No. Wells St., Chicago, Ill.; *Treasurer*, J. W. Gayle, Frankfort, Ky. *Place of Meeting*, Washington, D. C.

APPLICATION FOR MEMBERSHIP
IN THE
American Pharmaceutical Association

Approving the objects of the American Pharmaceutical Association, I hereby apply for membership in the Association and subscribe for the "Journal of the American Pharmaceutical Association," and enclose $5.00 as annual membership dues, $4.00 of which is for a year's subscription to the Journal.

Name in Full.....

(Write or print name in full—Initials are not sufficient)

Number and Street .....

Date..... **Town**..... **State**.....

Paid $..... **No.**.....

This application with the first year's payment of $5.00 may be sent to the Chairman of the Membership Committee, the Secretary or any officer of the A. Ph. A.

E. F. KELLY, Secretary,
10 West Chase Street,
Baltimore, Md.

OFFICERS OF PHARMACEUTICAL ASSOCIATIONS—1933-1934.

Secretaries are respectfully asked to assist in correcting this list and make the roster a mutual service.

Alabama.—*President*, Fred Martin, Birmingham; *First Vice-President*, C. C. Thomas, Selma; *Second Vice-President*, N. G. Hubbard, Birmingham; *Secretary*, W. E. Bingham, 1916 Broad St., Tuscaloosa; *Treasurer*, W. H. Ward, Tuscaloosa.

Arizona.—*President*, C. M. Wood, Glenndale; *Vice-President*, Joe Ryan, Globe; *Secretary-Treasurer*, Arthur Lee Phelps, 725 E. Fillmore St., Phoenix; *Chairman Executive Committee*, Jack Robertson, Phoenix. *Time*, 1933.

Arkansas.—*President*, Vince M. Harrington, Mariana; *First Vice-President*, Royce B. Wilkins, Conway; *Second Vice-President*, Gilbert F. Garner, Paragould; *Secretary and Business Manager*, Ed. Oslin, 4 Alpine Court, Little Rock; *Treasurer*, James K. Poch, N. Little Rock.

California.—*President*, Mrs. Edna Gleason, Stockton; *First Vice-President*, Clarence R. Brogan, Los Angeles; *Second Vice-President*, Jeff T. Scow, Berkeley; *Third Vice-President*, Charles R. Seward, Pasadena; *Treasurer*, John Wagner, Long Beach; *Secretary*, Roy S. Warnack, 430 H. W. Hellman Bldg., Los Angeles; *Executive Committee:* D. D. Wray, San Diego; Clifton P. Rose, Oakland; Thomas J. Lenehan, San Francisco; Frank E. Mortenson, Los Angeles; James C. Munn, San Francisco; Harvey A. Henry, Los Angeles; William Rutherford, Santa Rosa; R. M. Lease, Los Angeles.

Colorado.—*President*, Sebastian Kletzky, Pueblo; *First Vice-President*, Wm. C. Alexander, Salida; *Second Vice-President*, Paul G. Stodghill, Denver; *Treasurer*, Julius F. Earnest, Denver; *Secretary*, Charles J. Clayton, Denver.

Connecticut.—*President*, Edward J. Murphy, Manchester; *First Vice-President*, William J. Coughlan, West Haven; *Second Vice-President*, William J. Cody, Bridgeport; *Third Vice-President*, Joseph A. Murphy, Middletown; *Secretary-Treasurer*, P. J. Garvin, 20 Lake Place, New Haven.

Delaware.—*President*, Arthur H. Morris, Lewes; *First Vice-President*, Albert Bunin, Wilmington; *Second Vice-President*, Harry P. Jones, Smyrna; *Third Vice-President*, Edward J. Elliott, Bridgeville; *Secretary*, Albert Dougherty, Wilmington; *Treasurer*, Peter T. Bienkowski, Wilmington.

District of Columbia.—*President*, Paul Pearson; *Vice-Presidents*, Maurice G. Goldstein, *Northwest;* August C. Taylor, *Northeast;* Geo. Mathews, *Southwest;* B. A. Smyser, *Southeast*. *Executive Committee:* A. F. Gorsuch, T. A. Moskey, A. V. Burdine, F. B. Campbell.

Florida.—*President*, J. K. Clemmer, Miami; *First Vice-President*, Don Evans, Orlando; *Second Vice-President*, A. C. Hankins, Orlando; *Third Vice-President*, Victor Wray, Haines City; *Secretary*, G. H. Grommet, 2620 W. Eighth St., Miami.

Georgia.—*President*, H. L. Chichester, Macon; *First Vice-President*, W. T. Knight, Jr., Savannah; *Second Vice-President*, R. L. Olive, Augusta; *Chairman Board of Directors*, J. C. Neal, Calhoun; *Secretary-Treasurer*, R. C. Wilson, Athens. *Place of Meeting*, Savanah. *Time*, 1934.

Idaho.—*President*, J. B. Ostrander, Wallace; *First Vice-President*, Clyde Isenburg, Rupert; *Second Vice-President*, Charles Carter, Moscow; *Secretary-Treasurer*, Elmer B. Williams, Boise. *Place of Meeting*, Lewiston. *Time*, 1934.

Illinois.—*President*, Arthur Van Hooser, Metropolis; *First Vice-President*, George V. Haering, Chicago; *Second Vice-President*, H. M. Anderson, Monmouth; *Third Vice-President*, L. Brown Hamilton, Galesburg; *Secretary*, W. B. Day, 715 S. Wood St., Chicago; *Treasurer*, George M. Bennett, Urbana.

Indiana.—*President*, Asa E. Smith, Logansport; *First Vice-President*, Harry G. May, Princeton; *Second Vice-President*, Ira V. Rothrock, Mt. Vernon; *Third Vice-President*, G. T. Revington, Monticello; *Secretary*, F. V. McCullough, 303 Elsby Building, New Albany; *Treasurer*, Harry J. Borst, Indianapolis.

Iowa.—*Honorary President*, J. R. Sutter, Burlington; *President*, Olin E. Hill, Clinton; *First Vice-President*, Otto A. Bjornstad, Spencer; *Second Vice-President*, L. R. Henderson, Muscatine; *Third Vice-President*, L. R. Sidmore, Manson; *Treasurer*, J. M. Lindly, Winfield; *Secretary*, J. W. Slocum, Indianola.

Kansas.—*President*, Joe F. Demain, Macksville; *First Vice-President*, C. W. Evans Lombe, Coffeyville; *Second Vice-President*, Grover Clarkson, Greensburg; *Treasurer*, Walter Varnum, Lawrence; *Secretary-Manager*, Roy C. Reese, 824 Kansas Ave., Topeka; *Librarian*, Dean L. D. Havenhill, Lawrence. *Time*, 1934.

Kentucky.—*President*, George D. Duncan, Franklin; *Secretary*, J. W. Gayle, Ann and Broadway, Frankfort; *Treasurer*, Wm. J. Johnston, Mayfield; *Chairman, Executive Committee*, William H. Fischer, Louisville.

Louisiana.—*President*, Wm. August Worner, New Orleans; *Vice-Presidents*, Ernest Masson, New Orleans; A. J. Boudreaux, Opelousas; C. R. Caldwell, Shreveport; John W. Collens, Monroe; John E. Guess, Hammond; John P. Campbell, Jr., Alexandria; *Treasurer*, Elmo D. Cire, New Orleans; *Recording Secretary*, Joseph H. Berner, New Orleans; *Corresponding Secretary*, Paul Weilbacher, 2634 St. Philip St., New Orleans.

Maine.—*President*, Burton K. Murdock, Kennebunk; *First Vice-President*, Ralph A. Lockhear, Auburn; *Second Vice-President*, Horace T. Poland, Damariscotta; *Third Vice-President*, Ralph C. Trescartin, Phillips; *Secretary*, James H. Allen, Waterville; *Treasurer*, George O. Tuttle, Portland.

Maryland.—*Honorary President*, Dr. D. M. R. Culbreth, Baltimore; *President*, L. V. Johnson, St. Michaels; *First Vice-President*, A. F. Ludwig, Baltimore; *Second Vice-President*, H. W. Matheney, Cumberland; *Third Vice-President*, M. Strasburger, Baltimore; *Secretary*, E. F. Kelly, 10 W. Chase St., Baltimore; *Treasurer*, Harry S. Harrison, Baltimore; *Editor*, R. L. Swain, Baltimore.

Massachusetts.—*President*, Martin E. Adamo, Boston; *First Vice-President*, Joseph A. Martin, Malden; *Second Vice-President*, Joseph McAuliffe, Lynn; *Treasurer*, Lyman W. Griffin, Boston; *Secretary*, Carl G. A. Harring, 20 Glen Road, Newton Centre.

Michigan.—*President*, Duncan Weaver, Fennville; *First Vice-President*, Paul Gibson, Ann Arbor; *Second Vice-President*, J. E. Mahar, Pontiac; *Treasurer*, Wm. H. Johnson, Kalamazoo; *Secretary*, R. A. Turrel, Croswell.

Minnesota.—*President*, C. A. Anderson, Litchfield; *First Vice-President*, T. A. Arneson, Montevideo; *Second Vice-President*, P. G. Paulson, Fairmont; *Third Vice-President*, Barbara Piesinger, Northfield; *Secretary*, Gustav Bachman, Minneapolis; *Treasurer*, C. T. Heller, Jr., St. Paul; *Executive Committee Member*, F. W. Moudry, St. Paul.

Mississippi.—*President*, G. C. Roberts, Greenwood; *First Vice-President*, Lew Wallace, Laurel; *Second Vice-President*, J. S. Fuller, Starkville; *Secretary-Treasurer*, S. B. Key, Jackson. *Place of Meeting*, Jackson. *Time*, 1934.

Missouri.—*President*, Joe Knight, Lebanon; *First Vice-President*, Geo. C. Egy, Kansas City; *Second Vice-President*, John Emerson, Joplin; *Third Vice-President*, John J. Mueller, St. Louis; *Treasurer*,

(Continued on page xx)

Murray Q. Williams, Warrensburg; *Historian*, Ambrose Mueller, Webster Groves; *Secretary*, W. H. Lamont, 5838 Plymouth Ave., St. Louis; *Honorary President*, E. A. Sennewald, St. Louis.

Montana.—*President*, H. E. Rakeman, Jr., Ennis; *First Vice-President*, Emil Schoenholzer, Billings; *Second Vice-President*, Donald Wilson, Forsyth; *Third Vice-President*, Howard Craig, Drummond; *Treasurer*, C. A. Challman, Hobson; *Secretary*, J. A. Riedel, Boulder. *Place of Meeting*, Helena. *Time*, 1934.

Nebraska.—*President*, Frederick J. Creutz, Wausa; *First Vice-President*, Guy Butler, Lincoln; *Second Vice-President*, Frank Cline, Auburn; *Third Vice-President*, R. W. Dunkle, Shelby; *Fourth Vice-President*, N. L. Bellamy, Cambridge; *Fifth Vice-President*, Frederick V. Bors, Wilber; *Treasurer*, Orel Jones, Oconto; *Secretary*, J. G. McBride, 4603 Cleveland Ave., Lincoln. *Place of Meeting*, Omaha. *Time*, May 7–9, 1934.

Nevada.—*President*, Clarence Hale, Reno; *First Vice-President*, W. E. Ferron, Las Vegas; *Second Vice-President*, Frank F. Schwartz, Ely; *Secretary-Treasurer*, Lester J. Hilp, Reno. *Place of Meeting*, Las Vegas. *Time*, 1933.

New Hampshire.—*President*, Leo L. Desparte, Lebanon; *First Vice-President*, George Moulton, Peterborough; *Second Vice-President*, William Ryan, Keene; *Third Vice-President*, Lawrence Cate, Rochester; *Treasurer*, Edgar E. Goulet, Manchester; *Secretary*, Rodney A. Griffin, Franklin.

New Jersey.—*President*, Walter R. Woolley, Asbury Park; *First Vice-President*, Wm. H. Tegeler, Audubon; *Second Vice-President*, Wm. R. Richart, Elizabeth; *Secretary*, Prescott R. Loveland, 214 Chelsea National Bank Building, Atlantic City; *Treasurer*, Charles J. McCloskey, Culver Lake, Branchville.

New Mexico.—*President*, Roy E. Campbell, Fort Sumner; *First Vice-President*, S. J. Mollands, Taos; *Second Vice-President*, L. A. Rice, Albuquerque; *Secretary-Treasurer*, H. E. Henry, Albuquerque. *Place of Meeting*, Taos. *Time*, 1934.

New York.—*President*, John F. O'Brien, Rochester; *First Vice-President*, John Scavo, New York; *Second Vice-President*, Henry Wildhack, Newark; *Third Vice-President*, M. Brodkin, New York; *Secretary*, E. S. Dawson, 134 Greene St., Syracuse; *Treasurer*, Richard Austin, Cairo.

North Carolina.—*President*, J. C. Hood, Kinston; *First Vice-President*, R. A. McDuffie, Greensboro; *Second Vice-President*, E. F. Rimmer, Charlotte; *Third Vice-President*, P. B. Bissette, Wilson; *Secretary-Treasurer*, J. G. Beard, % University of North Carolina, Chapel Hill. *Place of Meeting*, Wrightsville Beach. *Time*, 1934.

North Dakota.—*President*, William Eckstrom, Stanley; *First Vice-President*, L. G. Beardsley, New Rockford; *Second Vice-President*, C. H. Saunders, Minot; *Secretary*, W. F. Sudro, State College Station, Fargo; *Treasurer*, P. H. Costello, Cooperstown; *Local Secretary*, Phillip H. Boise, Dickinson. *Place of Meeting*, Dickinson. *Time*, 1934.

Ohio.—*President*, Charles Ehlers, Cincinnati; *First Vice-President*, Thomas J. Ryan, Columbus; *Second Vice-President*, Clark A. Bloom, Youngstown; *Treasurer*, L. W. Funk, Columbus; *Secretary*, Theodore D. Wetterstrom, 314 Schultz Building, Columbus.

Oklahoma.—*President*, Ned Milligan, Oklahoma City; *First Vice-President*, M. J. Green, Helena; *Second Vice-President*, Bill Thornton, Sentinal; *Third Vice-President*, J. W. Gatewood, Pryor; *Secretary*, Elbert R. Weaver, Stillwater; *Treasurer*, G. C. Cooper, Edmond.

Oregon.—*President*, Harry A. Draper, Oregon City; *Vice-President*, Roy A. Perry, Portland; *Secretary*, J. C. Perry, Salem; *Treasurer*, Edgar A. Stipe, Portland.

Pennsylvania.—*President*, Robert R. Gaw, Pittsburgh; *First Vice-President*, Frank P. Kelly, Carbondale; *Second Vice-President*, George W. Grier, Pittsburgh; *Secretary-Treasurer*, J. B. Pilchard, 227 State St., Harrisburg. *Executive Committee, Chairman*, C. Leonard O'Connell, Pittsburgh; Henry Brown, Scranton; John C. Walton, Philadelphia. *Place of Meeting*, Wernersville. *Time*, 1934.

Philippine Islands.—*President*, Antonio G. Llamas, Manila; *First Vice-President*, Primo Arambulo, Manila; *Second Vice-President*, Florencio Gavino, Manila; *Secretary*, Alfredo G. Santos, University of Philippines, School of Pharmacy, Manila; *Vice-Secretary*, Antonia Pineda, Manila; *Treasurer*, Jose E. Jimenez, Manila; Concepcion Licauco, Manila.

Porto Rico.—*President*, Ramon Lopez Irizarry, San Juan; *Vice-President*, Vicente Hita, Jr.; *Secretary-Treasurer*, Washington Llorens, Arecibo; *Counsellors:* Maria del Carmen Capella; Alberto Peregrina; Miguel Perez Font; Enrique Gonzalez; Luis Mulet Monsanto; Hernan Alvarez; Andres de Leon; Angel M. Marin; Enrique J. Anglade; Carolos Leon; Alfonso Zerbi Martinez; Luis R. Emanuelli; Alberto J. Zamora; Eugenio Gonzalez.

Rhode Island.—*President*, W. Henry Rivard, Providence; *Vice-President*, Clarence Vars, Westerly; *Secretary-Treasurer*, James J. Gill, 1910 Westminster St., Providence. *Executive Committee, Chairman*, Henry J. McLaughlin, Providence; Louis Guny, Providence; James F. O'Connor, E. Providence.

South Carolina.—*President*, L. E. Bishop, Laurens; *First Vice-President*, V. F. Platt, Conway; *Second Vice-President*, George T. Kellers, Union; *Third Vice-President*, L. A. Melchers, Charleston; *Secretary-Treasurer*, J. M. Plaxco, Due West. *Place of Meeting*, Charleston. *Time*, 1934.

South Dakota.—*President*, Bliss Wilson, Letcher; *First Vice-President*, George Lloyd, Spencer; *Second Vice-President*, L. A. Daniels, Aberdeen; *Third Vice-President*, N. B. Porter, Madison; *Secretary*, Rowland Jones, Gettysburg; *Treasurer*, Frank S. Bockowen, Clark.

Tennessee.—*President*, Leslie F. Mitchell, Nashville; *First Vice-President*, R. R. Ferrell, Memphis; *Second Vice-President*, L. S. Elgin, Knoxville; *Third Vice-President*, P. P. Vance, Chattanooga; *Secretary*, William P. Winter, Nashville; *Treasurer*, H. J. Berryhill, Jackson. *Place of Meeting*, Knoxville. *Time*, 1934.

Texas.—*President*, Lee T. Stinson, Snyder; *Vice-President*, A. H. Seely, Belton; *Second Vice-President*, C. C. Harris, Houston; *Secretary-Treasurer*, Walter D. Adams, Forney; *Home Secretary*, A. W. Griffith, Austin; *Historian*, C. A. Duncan, Dallas. *Place of Meeting*, Mineral Wells. Time, 1934.

Utah.—*President*, Wilford L. Anderson, Wellsville; *First Vice-President*, John E. Booth, Spanish Fork; *Second Vice-President*, J. W. Christensen, Jr., Provo; *Treasurer*, Fred Elledge, Salt Lake City; *Secretary*, George F. Flashman, Salt Lake City. *Place of Meeting*, Ogden. *Time*, 1934.

Vermont.—*President*, Laurence W. Leonard, Randolph; *First Vice-President*, H. E. Colman, Barre; *Second Vice-President*, George E. Donovan, Fair Haven; *Third Vice-President*, J. W. Blakely, Montpelier; *Secretary-Treasurer*, Welcome B. Eastman, St. Johnsbury.

Virginia.—*President*, James M. Lea, Schoolfield; *Vice-Presidents*, Edward P. Berlin, Berryville; Guy L. Miller, Charlottesville; Robert G. Barr, Virginia Beach; Roy Crouch, Roanoke; H. S. Falconer, Newport News; W. G. Crockett, Richmond; *Secretary-Treasurer*, A. L. I. Winne, Richmond. *Place of Meeting*, Hot Springs. *Time*, July 9–11, 1934.

Washington.—*President*, F. R. Robertson, Spokane; *Secretary*, Harry W. Ayres, 1312 E. 63rd St., Seattle; *Treasurer*, Graham A. Condie, Seattle; *District Governors:* Charles Graham, Bellingham; Stanton Hall, Everett; Guy C. Norton, Tacoma; Carlton Sears, Olympia; George Sears, Chehalis; Dayton Garrison, Centralia; Jerry Patton, Longview; R. W. Reder, Vancouver; William Desmond, Aberdeen; Earl Brown, Bremerton; Murray Brown, Yakima; N. B. Krause, Walla Walla; Ray Price, Spokane; William Gray, Wilbur; J. E. Brayton, Sequim.

(Continued on page xxi)

West Virginia.—*President*, Charles V. Selby, Clarksburg; *First Vice-President*, H. D. Hankla, Bluefield; *Second Vice-President*, Paul M. Rogers, Morgantown; *Third Vice-President*, John A. Greear, Huntington; *Secretary-Treasurer*, J. Lester Hayman, 325 Ash St., Morgantown.

Wisconsin.—*President*, Otto H. Berndt, Manitowoc; *First Vice-President*, Edward J. Ireland, Madison; *Second Vice-President*, Paul Janke, Milwaukee; *Third Vice-President*, Dick Millbauer, Clintonville; *Secretary*, Ralph W. Clark, Madison; *Treasurer*, B. F. Leidel, Milwaukee.

Wyoming.—*President*, Tarvin Hoops, Cody; *First-Vice-President*, George R. Arnold, Thermopolis; *Second Vice-President*, H. H. Cordiner, Laramie; *Secretary-Treasurer*, John B. Tripeny, Casper. *Place of Meeting*, Casper.

NATIONAL ASSOCIATIONS.

American Association of Colleges of Pharmacy.—*President*, L. D. Havenhill, Lawrence, Kans.; *Vice-President*, Ernest Little, Newark, N. H.; *Secretary-Treasurer*, Zada M. Cooper, Iowa City, Ia.; *Chairman Executive Committee*, Lafayette, Ind., American Pharmaceutical Association.

American Drug Manufacturers' Association.—*President*, A. Homer Smith, Philadelphia; *First Vice-President*, Oscar W. Smith, Detroit; *Second Vice-President*, A. C. Boylston, St. Louis; *Third Vice-President*, John F. Anderson, New Brunswick, N. J.; *Secretary and Executive Vice-President*, Carson P. Frailey, Albee Building, Washington, D. C.; *Treasurer*, S. DeWitt Clough, Chicago. *Permanent Member Advisory Council*, Franklin Black. *General Council*, Horace W. Bigelow. *Members Executive Committee:* J. H. Foy, Newark; R. Lincoln McNeil, Philadelphia; Willard Ohliger, Detroit; L. N. Upjohn, Kalamazoo, Mich.; Nicholas H. Noyes, Indianapolis. *Advisory Council:* Charles J. Lynn, Charles G. Merrell.

American Pharmaceutical Association.—*President* R. L. Swain, Baltimore, Md.; *Honorary President* Edward Kremers, Madison, Wis.; *First Vice-President*, R. P. Fischelis, Trenton, N. J.; *Second Vice-President*, John C. Krantz, Jr., Baltimore, Md.; *Secretary*, E. F. Kelly, Baltimore, Md.; *Treasurer*, C. W. Holton, Essex Fells, N. J.; *Editor of the Year Book*, A. G. DuMez, Baltimore, Md.; *Editor of the Journal*, E. G. Eberle, Baltimore, Md. *Place of Meeting*, Washington, D. C.

American Pharmaceutical Manufacturers Association.—*President*, Carl L. Angst, Indianapolis, Ind.; *Vice-Presidents*, E. G. Paisley, Philadelphia, Pa.; F. W. Misch, Lincoln, Nebr.; *Secretary*, C. W. Warner, Newark, N. J.; *Treasurer*, Frank A. Mallett, Des Moines, Iowa; *Counsel*, Charles Wesley Dunn, 580 Fifth Ave., New York, N. Y.

Association of American Pharmacists.—*President*, A. C. Kasper, 25 Taylor St., San Francisco; *First Vice-President*, A. C. Anderson, San Francisco; *Second Vice-President*, E. S. G. Berwick, San Francisco; *Third Vice-President*, H. S. Colebaugh, Los Angeles; *Fourth Vice-President*, C. W. Round, Berkeley; *Fifth Vice-President*, Severn W. Miller, Jr., Davenport, Iowa; *Treasurer*, R. N. Jeans, San Francisco.

Federal Wholesale Druggists' Association.—*President*, Harry Krupp, Philadelphia, Pa.; *Vice-President*, Edward Seiberling, St. Paul, Minn.; *Secretary*, Lee Williamson, Baltimore, Md.; *Treasurer*, George Raab, Providence, R. I.; *Members of the Executive Committee*, O. W. Osterman, Philadelphia; F. W. Alexander, Boston, Mass.; H. H. Parker, Washington, D. C.; O. J. Cloughly, St. Louis, Mo.; Joseph Dreyer, Newark, N. J. *Place of Meeting*, Providence, R. I. *Time*, September 1934.

National Association of Boards of Pharmacy.—See end of State Boards of Pharmacy.

National Association of Drug Clerks.—*President*, Herbert J. Borgman, Racine, Wis.; *First Vice-President*, F. Garrison, Baltimore, Md.; *Second Vice-President*, Earl B. Pugh, Mobile, Ala.; *Third Vice-President*, Lewis Hite, Kansas City, Mo.; *Fourth Vice-President*, Charles F. Palbicki, Milwaukee, Wis.; *Secretary-Treasurer*, Paul J. Mandabach, 440 So. Dearborn St., Chicago, Ill.

National Association of Retail Druggists.—*President*, Monte L. Powell, Denver, Colorado; *First Vice-President*, H. L. Chichester, Macon, Ga.; *Second Vice-President*, George C. Bingham, New York City; *Third Vice-President*, Zack Kerrigan, St. Louis, Mo.; *Secretary*, John W. Dagravel, Minneapolis, Minn.; *Treasurer*, Oscar Rennebohm, Madison, Wis.; *Members of Executive Committee, Chairman*, Harvey A. Henry, Los Angeles, Calif.; George L. Secord, Chicago, Ill.; John Witty, Portland, Ore.

National Wholesale Druggists' Association.—*President*, Henry D. Faxon, Kansas City, Mo.; *First Vice-President*, J. Mahlon Buck, Philadelphia, Pa.; *Second Vice-President*, J. B. McCormick, Pittsburgh, Pa.; *Third Vice-President*, E. H. DeMoss, Louisville, Ky.; *Fourth Vice-President*, C. H. Gertridge, Seattle, Wash.; *Fifth Vice-President*, Kayton Smith, Savannah, Ga.; *Executive Vice-President and Secretary*, E. L. Newcomb, 51 Maiden Lane, New York City; *Treasurer*, Title Guarantee & Trust Co., New York City; *Washington Representative*, W. L. Crounse, Washington, D. C. *Place of Meeting*, White Sulphur Springs, W. Va. *Time*, 1934.

Proprietary Association.—*President*, Frank A. Blair, New York City; *First Vice-President*, E. K. Hyde, Buffalo; *Second Vice-President*, J. H. Howe, St. Louis; *Secretary-Treasurer*, Charles F. Tyrrell, Syracuse; *General Representative*, E. F. Kemp, 425 Star Building, Washington, D. C.; Harry B. Thompson, 422 Star Building, Washington, D. C.

United Medicine Manufacturers.—*President*, J. M. Ewing, Ligonier, Pa.; *Treasurer*, Wm. Holloway, Philadelphia, Pa.; *Counsel*, Clinton Robb, Washington, D. C.; *Chairman, Publicity Committee*, Paul J. Mandabach, Chicago, Ill.

Canadian Pharmaceutical Association.—*Honorary Presidents*, E. S. Knowlton, Vancouver; G. Graydon, Edmonton; F. C. Fielding, Toronto; F. A. Jacobs, Toronto; Omer St. Amour, Ste. Agathe; W. B. Mahoney, St. John; E. A. Foster, Charlottetown; *President*, H. D. Campbell, Winnipeg, Man.; *Vice-Presidents*, J. H. Best, North Battleford, Sask.; S. R. Balcom, Halifax, N. S.; *Chairman*, A. J. Wilkinson, Windsor; *Secretary*, R. B. J. Stanbury, 43 Victoria St., Toronto.

National Pharmaceutical Association of Cuba.—*President*, Dr. Eduardo Bello; *Vice-President*, Dr. German Perez Fuentes; *Treasurer*, Dr. Eligio Puig; *Vice-Treasurer*, Dr. C. J. Penichet; *Secretary*, Dr. Francisco Carrera; *Vice-Secretary*, Dr. Francisco Silva Trujillo; *Comptroller*, Dr. Jose Macias Diaz.

Mexico (Chemical Society).—*President*, Ignacio Ronterin; *Secretary*, G. G. Colin; *Treasurer*, Alfonso Castro; *Members of the Board:* T. Garcia Sancho and Esther Luque.

Insecticide and Disinfectant Manufacturers' Association.—*President*, Evans E. A. Jones, New York; *First Vice-President*, Peter Dougan, Rahway, N. J.; *Second Vice-President*, Samuel R. Bell, Pittsburgh; *Treasurer*, John Powell, New York; *Secretary*, Harry C. Coe, Holbrook, Mass.

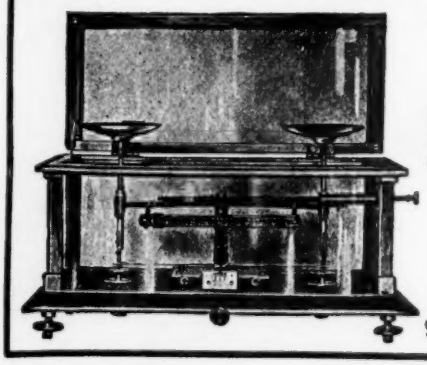
The National Pharmaceutical Syllabus, fourth edition, is 6″ x 9″, bound in cloth and contains 200 pages. The sales price for single copies is $2.25, post-paid; for five or more copies, $2.00 each, post-paid. Address Chairman J. G. Beard, Chapel Hill, North Carolina.

SWINDELL BROTHERS

BAYARD AND RUSSELL STS.
BALTIMORE, MD.

MANUFACTURERS OF

Highest Grade Bottles, Hand and Machine Made for Cork or Glass Stoppered.



1840 STANDARD OF EXCELLENCE 1933

HENRY TROEMNER'S
BALANCES · SCALES · WEIGHTS

For All Pharmaceutical Purposes

Price List on Application

HENRY TROEMNER
911 Arch Street Philadelphia, Pa.

The A. Ph. A. Patrons of the Advertising Pages

The JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION aims to give its advertisers full value; this is possible by the coöperation of the membership of the AMERICAN PHARMACEUTICAL ASSOCIATION—attention is therefore directed to the pages carrying the messages of the Advertising Patrons.

Directory of Advertisers

A. PH. A. Roster...x, xii, xiii, xiv
Boards of Pharmacy Roster....xvii, xviii
Conferences.....xv
State and National Associations Roster.....xix xx, xxi
Officers of the Local Branches, A. PH. A.....xvi

Books

J. B. Lippincott Company.....ii
McGraw-Hill Book Co., Inc....—
National Formulary V.....ii
Pharmaceutical Recipe Book....ii
Pharmaceutical Syllabus.....xxi
YEAR BOOKS, A. PH. A.....xi

Bottles

Kimble Glass Company.....v
Owens-Illinois Glass Company..—
Swindell Brothers.....xxii

Chemicals

Ciba Company.....xi
Hoffmann-La Roche, Inc..... vii
Mallinckrodt Chemical Works... 2nd Cover
Merck & Co.....ix
Schering & Glatz, Inc.....—
E. R. Squibb & Sons... 3rd Cover
Winthrop Chemical Co.....—

Colleges and Schools of Pharmacy

Buffalo.....—
Detroit.....xiv
George Washington Univ.....xiv
Massachusetts.....xv
Philadelphia.....xiv
Pittsburgh.....—
St. Louis.....xiv
University of Illinois.....xv
University of Maryland.....xv

Drugs

J. L. Hopkins & Co.....iii
S. B. Penick & Co.....—

Fire Insurance

American Druggists' Fire Insurance Co.....viii

Pharmaceuticals

Abbott Laboratories.....—
Armour & Company.....—
Ciba Company.....xi
Fairchild Bros. & Foster 2nd Cover
Hoffmann-La Roche, Inc.....vii
Hynson, Westcott & Dunning, Inc.....ii
Johnson & Johnson.....—
Eli Lilly & Co.....—
Parke, Davis & Co...Back Cover
Sharp & Dohme.....iv
E. R. Squibb & Sons... 3rd Cover
The Upjohn Company.....—
William R. Warner & Co.....i

Pictures for Framing.....xv

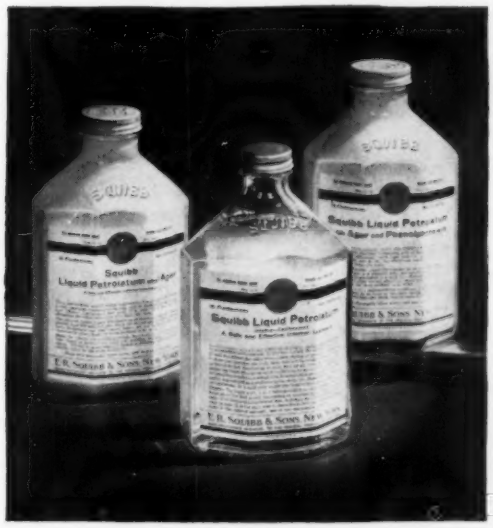
Scales and Balances

Henry Troemner.....xxii
Torsion Balance Co.....iii

Stock

SQUIBB LIQUID PETROLATUM PRODUCTS

for your discriminating customers



You need them to properly care for your mineral oil business—to satisfy the demands of your best customers—the quality-minded group who want the best.

You need the three types of Squibb Liquid Petrolatum Products because each fills a definite requirement. Some customers want the plain oil—some prefer the emulsion—and still others desire the emulsion with phenolphthalein. Stock the three types—display them.

You need them to give your mineral oil business prestige and make it produce profitable volume.

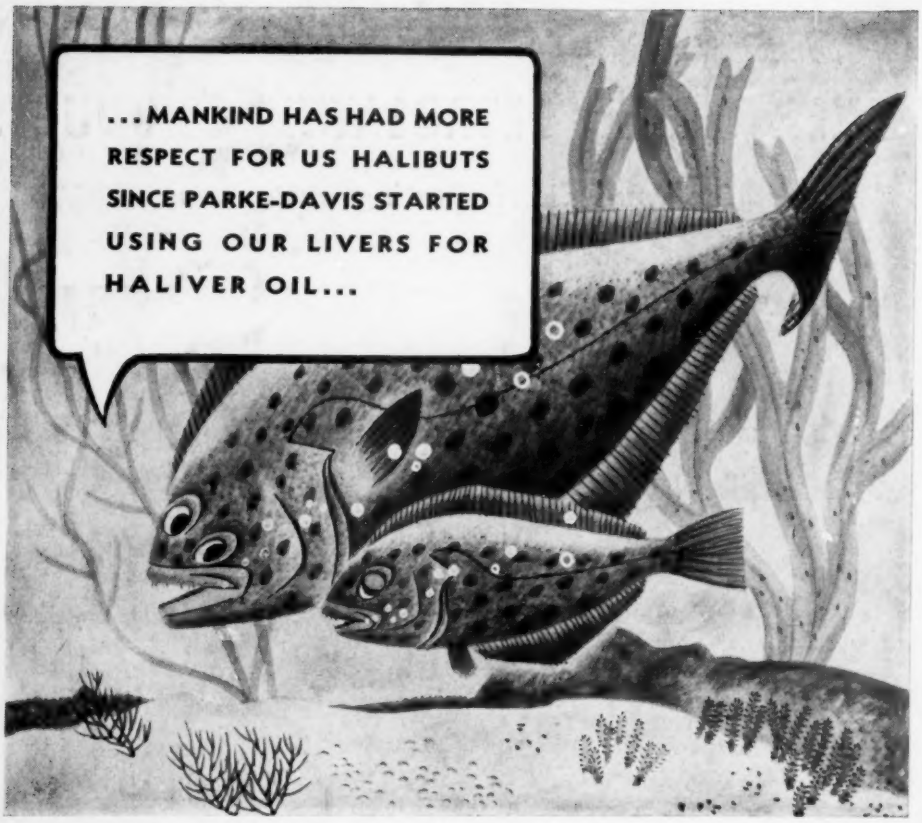
SQUIBB LIQUID PETROLATUM PRODUCTS

SQUIBB LIQUID PETROLATUM—A heavy Californian whole naphthene oil with high, natural viscosity. Colorless, odorless, tasteless. Does not build fat.

SQUIBB LIQUID PETROLATUM WITH AGAR—A palatable product for those having an aversion to the plain oil.

SQUIBB LIQUID PETROLATUM WITH AGAR AND PHENOLPHTHALEIN—A pleasant-tasting emulsion fortified to give quicker action.

When your customers ask for "Mineral Oil" sell them Squibb's . . . It's a product that appeals to quality-minded buyers



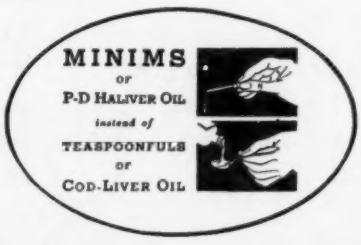
THE halibut has spectacularly nosed out the cod as the richest natural source of vitamins A and D—and Parke-Davis Haliver Oil products have the call!

Physicians have gratefully turned to Haliver Oil—the new and easy way to give vitamins A and D. No one knows better than they that, valuable as cod-liver oil is, some children won't take it, and some children *can't*. And these same doctors have plenty of adult patients *who act like children* when it comes to taking cod-liver oil!

All around you, physicians are prescribing and recommending Parke-Davis Haliver Oil products, and we want you to get your share of this business. Be prepared to supply *Parke-Davis* Haliver Oil. For Parke-Davis Haliver Oil products have the call. They have very decidedly won professional preference, a preference which is growing stronger with each passing day.

Parke-Davis Haliver Oil with Viosterol-250 D—supplied in 5-cc. and 50-cc. vials, with dropper cap, and in boxes of 25 and 100 soluble gelatin capsules of 3 minims each.

Parke-Davis Haliver Oil Plain—supplied in 10-cc. and 50-cc. vials, with dropper cap, and in boxes of 50 soluble gelatin capsules of 3 minims each.



Physicians Everywhere Are Prescribing Parke-Davis Haliver Oil Products